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PROBLEMS IN BEGINNING INDUSTRIAL ARTS TEACHING

BY

DAVID ARTHUR IBLE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

EDMONTON, ALBERTA

FALL, 1974

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled, "Problems in Beginning Industrial Arts Teaching," submitted by David Arthur Ible, in partial fulfilment of the requirements for the degree of Master of Education.

Supervisor

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Date 2 October 1979.

ABSTRACT

The primary objective of this study was to identify problems experienced by industrial arts teachers in their initial three years of teaching. The secondary objectives were to describe, analyze and compare problems of beginning industrial arts teachers according to the independent variable of year of teaching, type of teaching, experience, size of community, and type of teacher training.

A questionnaire containing 100 problem statements representing seven major problem categories was constructed and placed on a five-point Likert scale. Prior to being used in the major investigation, the instrument was subjected to a pilot study and revised. The research instrument was mailed to 72 beginning industrial arts teachers who made up the population of the study.

Of the 61 questionnaires received, 52 were analyzed and compared to yield data concerning the 20 most difficult problems for the entire sample and for each group that comprised the independent variables. Information regarding the major problem categories, distribution of means for the 100 problem statements and correlations of means among independent variables were tabulated.

The findings of the study were:

1. The means of the 20 most difficult problems for beginning industrial arts teachers in the sample ranged between "Very difficult to solve" and "Somewhat difficult to solve" on the five-point scale of difficulty:

2. Beginning industrial arts teachers represented by the sample experience the most difficulty with the categories of evaluation and aids, materials and resources.

3. Differences in problem statements and categories of problem statements were most evident in the years of teaching variable and the type of training variable. Third year teachers perceived more difficult problems than first or second year teachers. Teachers without a Bachelor of Education in Industrial Arts perceived fewer difficult problems than did teachers with a Bachelor of Education in Industrial Arts.

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CHAPTER I

THE PROBLEM

Introduction

A gap between theory and practice prevails in most occupations or professions. Individuals who practice such professions as medicine or law must undergo an extensive period of internship or articling as a measure to narrow the gap between theory and practice. Trade apprentices are supervised for long periods of time by journeymen or master craftsmen before obtaining a certificate of proficiency in their trade. In comparison to trades and other professions, prospective teachers expend little time under the guidance and supervision of a qualified and experienced person in bringing together theory and practice.

In the Province of Alberta, university students preparing to become teachers normally engage in 10 weeks or a minimum of 100 hours of practice teaching. This experience includes observation, practice teaching and the assumption of many of the responsibilities of the supervising teacher. The only other opportunity to work directly with experienced teachers is through internship programs conducted by the Department of Education. The internship programs in Alberta, usually offered in May and June, have been reduced significantly because of recent spending restrictions in education. Consequently, most beginning teachers in Alberta have only a limited amount of supervised teaching experience before they begin their first in-service teaching assignment.

The assistance available to a beginning teacher during his

initial in-service teaching experience is the obligation of the school system employing him. Unfortunately, as expressed by Yauch, Bartels and Morris (1955), "a short, usually inadequate orientation or induction program for new personnel represents all the help that administrators feel that they can afford to give"(p.vii). In further discussing this issue, these authors state "The wide gap between theory and practice is often left to the new teacher to close, without benefit of help from either the preparing institution or the public school"(p.vii).

Orientation and induction programs offered by the employing school district attempt to predict problems that beginning teachers might have and generally center around the administrative tasks that a teacher is to perform in order to function effectively in a school. Few, if any, of these programs for the beginning teacher are directed at the problems that teachers will face in the classroom.

Although research investigations have been completed that were directed at the problems of the beginning teacher, these studies dealt primarily with the elementary and secondary teachers in general. A formal research investigation needs to be conducted into the problems of teaching specific subject areas such as industrial arts. The purpose of such research would be to provide information upon which decisions about pre-service and in-service content could be based.

This researcher believes that some program of assistance for beginning teachers is desirable and must be based on a carefully compiled and substantive description of the exact problems experienced by beginning teachers. Assistante to beginning teachers must be based on

actual problems identified in systematic research, rather than anticipated problems perceived by school administrators and academics who may be unaware of many of the pertinent factors.

Statement of the Problem

The purpose of this research was to identify the most difficult teaching problems perceived by industrial arts teachers in their initial years of teaching.

Significance of the Study

In 1962 the Department of Industrial and Vocational Education was formed within the Faculty of Education at The University of Alberta. A position paper of the Department of Industrial and Vocational Education (1965), outlining the major functions of the department, stated that the department "provides for the preparation of junior and senior high school industrial arts teachers for schools in the Province of Alberta" (p.5). The establishment of this department in the Faculty of Education prefaced many changes in industrial arts - both in teacher education and in the program of studies offered by the schools in the province. The resulting changes in teacher education were extensive: a new philosophy of industrial arts was presented; a new organizational pattern for the learning environment was initiated; industrial arts laboratories were organized as multiple activity laboratories rather than as unit shops; and a new program of studies was taught at the university.

Since its inception, little formal research has been completed by personnel of the Department of Industrial and Vocational Education to determine the success of its industrial arts teacher education program. One method of determining the success of a teacher education

program would be to study the problems and deficiencies of the graduates as they adjust to the role of teacher. This study will attempt to determine the problems experienced by industrial arts teachers in their initial years of teaching. The results of this study may be of interest to personnel of the Department of Industrial and Vocational Education as they review and revise course content.

In an unpublished master's degree thesis, Milne (1966) postulated that there are three possibilities in considering what happens to beginning teachers as they are confronted with problems of teaching.

> The strongest and most capable become competent and successful teachers. Others may lose their enthusiasm and accept teaching with indifference. A third possibility represents teachers who resign from the teaching profession(p.2).

Individuals who fall into Milne's second category should be of concern to both the teacher educators and the teaching profession. The fact that some beginning teachers may accept their initial job with indifference might affect the quality of their teaching and the quality of the educational program that they offer. The teaching profession and society cannot tolerate anything except the best of teaching. If excellence in teaching is to be a goal of the teaching profession, then the problems relating to indifference and ineffectiveness of beginning teachers should be studied.

Milne's third alternative should be of concern for teacher educators and school boards. In a period of high demand and low supply of industrial arts teachers, every effort should be expended to retain individuals who are well trained but lose interest in teaching because of frustration and lack of assistance in their early endeavors.

In conclusion, it is hoped that the results of this study will

be a step in a positive direction to insure the highest quality of teacher education programs and the least number of problems for beginning teachers.

Definition of Terms

The following definitions apply to the terms used throughout this study.

Industrial Arts

There are numerous definitions of industrial arts that are encountered in the literature. A definition given by Feirer and Lindbeck (1964) was found suitable for this study:
"Industrial arts is the broad study of tools, machines, materials, equipment, processes, products, and occupations of industry, pursued for general educational purposes in the shops and laboratories"(p.15).

Junior High School

Junior high school refers to the second phase of a 6-3-3 plan of school organization which encompasses grades seven, eight and nine and serves the educational needs of children aged 12 to 15. This definition was constructed from the text of the Junior-Senior High School Handbook, 1974-75, published by the Department of Education, Province of Alberta.

Senior High School

Senior high school refers to the final phase of a 6-3-3 plan of school organization including grades 10, 11 and 12, and serves the educational needs of youth beyond the age of 15. This definition was also constructed from text in the Junior-Senior High School Handbook, 1974-75.

Rural Community

Rural community refers to a community with a population of less than 5,000.

Urban Community

Urban community refers to a community with a population greater than 5,000.

Multiple Activity Laboratory

An adequate definition of the term multiple activity laboratory was found in the Junior High School Curriculum Guide in Industrial Arts, 1969, for the Province of Alberta. "Multiple activity laboratory" is defined as "a laboratory where three or more activities are in progress at the same time"(p.3).

Beginning Industrial Arts Teacher

A beginning industrial arts teacher is an industrial arts teacher who is in his initial three years of teaching industrial arts as outlined in the provincial curriculum guides for junior and senior high industrial arts.

B.Ed. in Industrial Arts

The University of Alberta, Faculty of Education Calendar (1974-75) outlines the principles underlying the degree of B.Ed. In part, it states: "The Faculty of Education offers a B.Ed. degree consisting of the equivalent of 20 full-session courses which normally will be completed in four academic years" (Section 73.1.1). The basic framework for a B.Ed. in Industrial Arts is taken from the same source in Section 73.4.2, Plan G.

Component		Number of course equivalents
(a)	Non-Education Courses	6½
(b)	Teaching Specialization	3½
(c)	Student Teaching	1
(d)	Curriculum and Instruction	4
(e)	Basic Education Courses	3
(f)	Free Options	2
		20

Note: Components (b) and (d) are taken in departmental laboratories.

Objectives of the Study

The primary objective for this study was to identify the most difficult problems faced by beginning industrial arts teachers in their initial years of teaching.

The secondary objectives were:

1. To determine, analyze and compare the most difficult problems of first, second and third year industrial arts teachers.

2. To determine, analyze and compare the most difficult problems of junior high, senior high, and combined junior and senior high school beginning industrial arts teachers.

3. To determine, analyze and compare the most difficult problems of urban and rural beginning industrial arts teachers.

4. To determine, analyze and compare the most difficult problems of beginning industrial arts teachers with a B.Ed. in Industrial Arts and beginning industrial arts teachers who have not completed a B.Ed. in Industrial Arts.

5. To determine the type or category of problems that were most difficult for beginning industrial arts teachers.

6. To compare the degree of difficulty of problems for each of the sub-groups referred to in objectives one, two, three, and four above.

Assumptions

The following assumptions apply to this study.

1. The instrument used to measure teacher problems was reliable and valid.

2. Beginning industrial arts teachers have problems and are able to perceive them.

3. The Likert scale of difficulty was equal interval.

4. The sample of returned questionnaires represented the entire population determined for the study.

Delimitations

This study had the following delimitations.

1. The study was restricted to teachers in their first three years of teaching industrial arts in Alberta.

2. The study was confined to industrial arts teachers who received their industrial arts teacher education in the Department of Industrial and Vocational Education, Faculty of Education, The University of Alberta.

3. The study was restricted to those problems directly related to teaching industrial arts.

4. The study was confined to the responses of those teachers who were selected to participate in the study.

METHODOLOGY

Instrumentation

An extensive review of the available literature failed to find an instrument that would satisfactorily measure problems of beginning industrial arts teachers in Alberta. There were, however, existing instruments that could be modified and combined to produce an instrument. Using three other questionnaires as a foundation, a new questionnaire, containing 100 problem statements and representing seven major categories, was designed.

With the advice of an expert in instrumentation, from the Department of Educational Psychology, Faculty of Education, of the university, a five-point modified Likert scale was selected to measure the level of difficulty for each problem statement.

As the questionnaire was untested, a pilot study was deemed necessary to establish answering time, ease of understanding and usefulness of the scale of difficulty. As a result of the pilot study, changes were made in the wording of some problem statements, two statements were added and two statements were deleted, and the scale was

modified to allow for a "Not relevant" response to all statements.

The Population

A population of all industrial arts teachers who were in their initial three years of teaching industrial arts, who had had their industrial arts teacher education at The University of Alberta, who were still teaching industrial arts in Alberta, and who had had student teaching in industrial arts was selected to participate in the study. Lists of beginning teachers from the Department of Education records and student teaching records from the Division of Field Experience, Faculty of Education, The University of Alberta, were used to identify the specified population.

Administration of the Questionnaire

After the population was determined, the school districts in which the teacher presently taught were notified and permission was requested to involve the teachers in the study. All superintendents contacted gave permission to involve their teachers to participate in the study. Questionnaires were then mailed to these beginning industrial arts teachers. Included with this mailing was a covering letter that explained the study and its purpose. This letter also established a deadline for return of the completed questionnaire.

When two weeks had elapsed after the deadline date, a follow-up letter was sent to those who had not returned completed instruments. When 85 percent of the participants returned completed questionnaires, these were scrutinized to insure that the respondents met the established criteria. Finally, 52 questionnaires were retained for analysis.

Analysis of the Data

The information from the questionnaires was placed onto punched cards. It was computer-programmed to process means; standard deviations; correlations; and a summary of the responses to all items on the questionnaire, and for the 10 independent variables. Further manual processing obtained the 20 most difficult problems, the categories of problems and the means' distributions for each of the 10 independent variables on the 100 problem statements. The information was then tabulated, analyzed and compared. Conclusions, implications and recommendations were then drawn from the data.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this chapter is to present the findings from a review of the literature that will demonstrate that beginning teachers do experience problems and will also demonstrate what researchers have found as a possible solution to these problems. This chapter will present a description of those studies that provided a data base for this study, particularly those that were directed toward industrial arts. Finally, the chapter will conclude with an explanation and documentation of the major categories used for grouping problem statements.

Difficulties in Teaching and Their Solution

The task of teaching is becoming increasingly more complex. As technology expands so does man's desire for knowledge. As the desire for knowledge expands so do the expectations made of the schools and those who teach in them. Demands are constantly being made by parents and students for changes in the educational system to reflect changes in contemporary society. They seek changes in philosophy, values, objectives, course content, and methodology used to present content.

Yauch, Bartels and Morris (1955) discuss the complexities of teaching:

> Teaching is one of the most involved and complex activities in which a person can engage.... The science of teaching demands a comprehensive knowledge of human behavior and how it may be changed. The art of teaching requires a high degree of skill

> in working with human beings in such a way that they develop into more creative, independent, understanding adults. Not even a small part of this desirable equipment of a teacher will be obtained in the four years of preparation (p.238).

Corey (1969) discussed the expansion of the responsibilities of the beginning teacher in comparison with the experienced teacher when he wrote:

> Cocurricular activities have expanded, teachers are expected to do more counselling, class periods have increased in length, democratic participation of teachers in planning and policy making have increased discipline problems....
>
> The work load of the beginning teacher is, in most districts, no lighter than that of his more experienced colleagues. In fact the beginner often gets the difficult situations which the older teacher avoids (p.7).

The complexity of the teaching task, the limited practical pre-service education, and the expanding role of the teacher are all factors that could result in increased anxiety and frustrations for beginning teachers. Bush (1965) discussed the difficulties of beginning teachers when he stated: "The symptomatic clue that all is not well is the high drop-out rate during the first years."(p.8) In discussing the high drop-out rate among first year teachers, the same author stated:

> A significant number of those trained are lost in the first years. Part of those who stay have their enthusiasm blunted and may turn into 'indifferents' who arrive on time, leave on time, and develop their major interests elsewhere (p.8).

Towers (1956), in a study of problems of beginning elementary teachers, discussed possible solutions to teacher problems and also suggested solutions when he wrote the following:

> Teacher failure is a vital concern of all who share in the responsibility of preparing teachers, of employing and placing them, and of organizing and executiving orientation and in-service education programs. Administrators and supervisors should identify the problems facing beginning teachers and provide orientation and in-service education programs to help teachers meet these difficulties (p.261).

Implicit in Towers' statement is that programs of in-service and orientation should be based on problems of beginning teachers identified by administrators and supervisors. Although it is difficult to disagree with Towers, Lano (1971) is concerned with teacher involvement in identifying teacher problems. On this issue Lano stated:

> Too often teacher education programs are conducted without direct teacher input. Surveys of teachers' needs - needs expressed by teachers - are few and infrequent.
>
> The danger that teacher education programs may become insensitive to actual teacher need is a perennial threat in teacher education. Almost without notice an otherwise well-organized program of teacher education can drift away from the urgent issues and problems confronting the teacher (p.47).

In-service programs in education should be the concern of colleges and universities, local school systems and teachers themselves. Colleges and universities must realize that their responsibility does not end with the awarding of a degree. Local school systems should be in a position of aiding the teacher in applying theory learned in university to actual classroom settings. It is the teacher's responsibility to voice his desires for a say in the establishing of in-service programs.

Studies of Problems of Beginning Teachers

A review of the literature concerning problems of beginning teachers can be divided into two major categories. The first major category consists of problems of beginning teachers in general. This category deals with studies of teacher difficulties regardless of the field of specialization. The second major category of research is concerned with problems faced by specialist teachers such as teachers of industrial arts. Although this research was concerned only with the

problems faced by beginning industrial arts teachers, a review of the problems encountered by beginning teachers was made because of its possible bearing on this research.

Perhaps the most significant study in the category of general teacher problems is one done by Dropkin and Taylor (1963). The authors of this study were particularly concerned with problems of beginning teachers in New York inner city schools as compared to the problems faced by beginning teachers in suburban schools of New York. In order to identify teachers' problems, these researchers designed an instrument that would give reliable measures for problems in relatively independent areas of teacher activity. The instrument, a questionnaire, also permitted the participants to identify a degree of difficulty for each problem rather than simply ranking each statement. To construct the questionnaire these researchers modified an earlier instrument developed by Smiley and Sprague (1961). The questionnaire designed by Dropkin and Taylor was made up of 70 items which covered seven major categories in which beginning teacher problems could be placed. The categories were: classroom routine, methods of teaching, materials and resources, planning, relations with parents, evaluating, and discipline. Participants of the study rated each problem statement on a six-point scale.

In a more recent research investigation Milne (1969), in a master's thesis, completed at The University of Alberta, utilized the instrument developed by Dropkin and Taylor (1963) with some modifications. Milne, in his review of relevant literature, found one important problem category that Dropkin and Taylor did not consider. This was the category of professional relationships. Milne added this

problem category, together with the other seven categories used by Dropkin and Taylor, in the design of his questionnaire. Milne also added more problem statements and reduced the six-point scale to a five-point scale. The questionnaire was used by Milne to study the problems of all first year teachers in the Edmonton Public School System.

Both the Milne study and the study done by Dropkin and Taylor were of valuable assistance to this research. These studies had been formulated upon an exhaustive research into the field of teacher problems. An additional benefit of these studies was the modification and refinement of the Dropkin and Taylor instrument by Milne to suit the teaching situation in local schools.

However, these two studies are deficient in that they did not make a distinction between problems of specialized teaching such as industrial arts. These studies did not consider some of the unique problems such as equipment repair, laboratory management, handling supplies, safety practices, etc. that are of concern for industrial arts teachers.

The review of the literature identified several studies that were completed in the United States in teaching specializations related to industrial arts, vocational education, and trade and industrial education.

The study that had the closest relationship to this research was one completed by Reese (1954) in the State of Ohio. In conducting his research Reese developed an instrument for the purpose of determining the major problems of beginning trade and industrial education

teachers in Ohio. His objective for conducting the research was to determine the effectiveness of Ohio's program of teacher training in helping teachers to solve their problems. To collect data Reese designed a check list of 95 factors which described potential problems for beginning teachers and submitted this list to 275 trade and industrial teachers in their first four years of teaching. The teachers were asked to check which factor represented problems to them and to indicate if their teacher training had helped them with these problems. Reese tabulated the results into groups of factors that were problems for 60 percent of the teachers, between 60 and 40 percent of the teachers, and less than 40 percent of the teachers. He then listed the factors which 20 percent of the teachers said their teacher training did not help them in solving.

Many of the statements that were used by Reese were reworded to represent industrial arts teaching problems in Alberta and used in the instrument for this investigation. Reese's method of collecting the data was modified for this study by substituting a Likert scale for the two column check list to measure difficulty. Reese was not concerned with determining the degree of difficulty of the problems faced by beginning teachers. His major concern was the tabulation of frequencies.

Other studies completed in the United States played a minor role in this research. Three studies: Harrison (1955), Shackelford (1955) and Van Dorn (1961) all analyzed problems of industrial arts teachers. The purpose of the Harrison study was to investigate "professional difficulties" of 223 beginning industrial arts teachers and

to make comparisons of the difficulties by such variables as: scholastic achievement, type of shop (unit or general), type of supervision, type of school, and length of teaching experience.

Harrison's instrument, used to measure teaching difficulty, utilized the major categories of curriculum instruction, physical facilities, pupil-teacher relationships, community, personal, subject field, administration and organization, and professional development.

The purpose of the Shackelford study was to investigate the problems of "new" industrial arts teachers in Florida with the hope of reducing teacher drop-out. Shackelford used an interview technique to ascertain the difficulties of beginning industrial arts teachers. He interviewed principals, industrial arts teachers, supervisors, and department heads to obtain his data. Problem statements were placed into the following categories: instruction, teacher-pupil relations, philosophy and procedures, administration and teachers, personal relations, teachers and equipment, supplies and materials, physical facilities, community relations, and housing.

Van Dorn (1961) also studied the problems of beginning industrial arts teachers. This research expressed concern about the lack of studies that were directed at the problems of industrial arts teachers in their initial years of teaching. In conducting his research, Van Dorn studied the problems of beginning industrial arts teachers who graduated from San Diego State College and were in their initial year of teaching. He was particularly interested in looking at problems that beginning industrial arts teachers had in the areas of laboratory facilities, supplies, projects, safety, demonstrations, and care of equipment.

Categories of Problems for This Study

In many of the studies into teacher problems mentioned in the previous section of the review of the literature, major categories were selected to group similar types of problems. For ease of comparison and discussion the problems were grouped into such categories as working conditions, evaluation, and administration and organization.

Each of the previously mentioned studies used a different set of categories, depending on the purpose, scope and situation for the study. Often different terms were used to describe similar types of problems. For example, where Towers (1956) used the term "classroom instruction", Milne (1968) used the term "methods of teaching" to describe similar groups of problem statements.

To establish the major categories in which to place problem statements for this research an extensive review of the literature was made. The major problem categories selected were administrative routine, aids, materials and resources, laboratory management, evaluation, curriculum, professional development, and teaching methodology.

Administrative routine. Administrative routine in this study was used to categorize all those problems that were concerned with the everyday administration of a school or classroom. Dropkin and Taylor (1968) used the term "classroom routine" in their research. Milne found that "classroom routine" presented little difficulty for beginning teachers. Harrison (1955) in his study used the terms "administration" and "organization" and Metfessel and Shea (1961) used the term "administrative relationships". Towers (1956) reported that teachers needed some assistance in keeping records, making reports, handling

supplies, and learning routines. The term "administrative routine" was selected for this study because it most accurately and inclusively described the type of problem to be studied.

Aids, materials and resources. The term "aids, materials and resources" was used in this study to refer to all those problems that were concerned with the knowledge of, construction of, and utilization of available hardware and software that would act as a catalyst or reinforcement in the teaching-learning situation. This category included problems in finding aids, constructing aids, obtaining appropriate books, films, television and radio programs, and outside resource people.

The category of aids, materials and resources was used by Milne (1968) and was found to be one of the most difficult problem areas for beginning teachers. Reese (1954) also used a similar category and also found it to be of major concern for beginning teachers.

Laboratory management. The term "laboratory management" was unique to this study.

The multiple activities industrial arts program characteristic in Alberta schools has led to new problems for the industrial arts teachers. Cochran (1970) discusses the change from one activity unit shops to multiple activity laboratories:

> Interwoven into the total industrial arts movement was a second departure. This shift focused greater attention on the organizational problems...
>
> The general shop organization came to be the popular version of the multiple activity program that was conceived as an answer to the dilemma. Under such an arrangement, the students participated in various activities with a variety of tools, equipment and materials (p.6).

As a result of the multiple activity approach, an industrial arts teacher must organize, maintain and utilize large amounts of space, equipment, and supplies in order to provide a safe and efficient learning environment.

Laboratory management for this study is part administration, part organization and part teaching methodology that is needed to provide for a multiple activity learning environment where students can learn the industrial arts and technologies.

Teaching methodology. Reese (1954) used the term "teaching techniques", Milne (1968) used the term "methods of teaching" and Shackelford (1955) called his major category "instruction". These terms were used by the authors to describe similar types of problems. Silvius and Bohn (1960) distinguish between teaching methods and teaching techniques. According to these authors methods of teaching "are the orderly procedures that direct learners in developing skill and habits, acquiring knowledge and attitudes" (p.210). Teaching techniques "are the refinements of presentation which the individual teacher employs to make instruction more efficient when using a method of teaching" (p.212). For the purpose of this study teaching methodology includes both methods and techniques of teaching.

Dropkin and Taylor (1962) and Milne (1968) separated planning from methods of teaching. Planning and teaching are so closely integrated, and in this study will be one category called "teaching methodology".

Evaluation. Evaluation was selected as a major category of problems for this study. Dropkin and Taylor (1962); Milne (1968); and

Towers (1956) all reported some difficulty in this category for beginning teachers. Milne (1968) found this category to be one of the most difficult for beginning teachers.

Baird (1972) said that "a broad concept of evaluation in industrial education courses is one of the most significant attitudes that a teacher may acquire" (p.137). He goes on to say that evaluation includes such things as evaluation of objectives, teaching effectiveness, program effectiveness, methods of test construction, and establishment of program objectives.

The concept of evaluation as used in this study is generic and includes the curriculum, facility, student and teacher evaluation.

Curriculum. Curriculum was another major category of problems of beginning industrial arts teachers. It was found in several other studies that have been reported. Shackelford (1955) used the term "philosophy and procedures"; Harrison (1955) called the category "curriculum and instruction"; Reese (1954) used a category "instructor knowledge and activities". Curriculum, as used in this study, refers to a category of problems which includes: teacher knowledge of philosophy, aims and objectives, course content, and learning theories associated with industrial arts.

Professional development. Authors of other studies have used other terms for professional development. In this study "professional development" was used to categorize all problems that related to a teacher's attempt to upgrade himself in his profession, both in his academic and personal qualities. Professional development also included problems of relationships with other members of his profession.

Harrison (1955) used the terms "professional" and "personal" in his study. Reese (1954) was concerned with "personal qualities". Milne (1968) modified the Dropkin and Taylor (1962) categories under the category of "professional relations". He found the area presented a moderate degree of difficulty to beginning teachers. Milne was especially interested in the relationship between administrators and teachers. A study by McGillivray (1966) showed disagreement between teachers and administrators in areas such as workload. The teachers felt that they had too many administrative duties to perform which conflicted with their teaching.

CHAPTER III

METHODOLOGY

Introduction

The preceding chapter reviewed the professional literature which was either directly related to this study or had an influence on it. This chapter describes the research procedure in greater detail than previously outlined in the first chapter. Here the design and development of the research instrument used to collect data for the study will be dealt with. Part of the chapter will describe the selection of the participants in the study. Another section will describe the administration of the research instrument, a questionnaire to the participants. A final section will outline the procedure for screening the instrument and the tabulation of the information gained for analysis.

The Questionnaire

As reported in the review of the literature, several research studies of the problems of beginning teachers have been completed and their results reported. Some of these studies have been rather general and have included all beginning teacher, i.e. Dropkin and Taylor (1963) and Milne (1968). Other completed studies, such as Reese (1954), Shackelford (1955) and Van Dorn (1962), concentrated on teachers of particular subject areas. Many of these studies, however meaningful the results, were found not to be applicable to this research. Studies that were designed for an entire population of beginning teachers were

found to be limiting. Because of their general nature, they could not yield data about teachers of specific subject matter such as industrial arts. Research investigations that were concerned specifically with industrial arts, industrial education or trade education, were all completed in the United States. Much that was contained in the instruments used in these studies was not appropriate for a study conducted in Alberta because of differences in vocabulary and curricula. The questionnaire was constructed in four steps. The first step was to determine, from a library search of the available literature, the major problem areas faced by beginning teachers. An investigation of other studies was made to develop a list of problem areas that was comprehensive and representative of the process of teaching in general and of industrial arts specifically.

It was found that the major problem faced by beginning teachers could be placed in one of the following seven categories.

A. Administrative routine

B. Evaluation

C. Curriculum

D. Professional development

E. Laboratory management

F. Teaching methodology

G. Aids, materials and resources

The second step in the construction of the questionnaire was to identify specific statements which would describe problems faced by a beginning industrial arts teacher. One of the best sources for these statements was the instrument used by Reese (1954). Many of Reese's statements were rewritten so that they were applicable to teachers of

industrial arts in the schools of Alberta. Other questionnaire statements were taken from the work done by Milne (1968). In conducting his research Milne used a revision of an instrument designed by Dropkin and Taylor (1963).

In selecting problem statements for the research instrument, care was taken to eliminate statements that were problems of personality or working conditions. Only those problem statements relevant to the process of teaching were selected for inclusion in the questionnaire. A total of 100 problem statements was identified and each statement was put on a file card. The cards were then sorted into the seven major categories according to the definitions and criteria prescribed in Chapter II. Because the problem statements were randomly placed into the questionnaire (a procedure recommended by Kerlinger (1964)), the researcher made a list of each problem statement and gave it a number as it appeared on the final form of the questionnaire. Below, in Table 1, is a listing of the category each statement was placed in, and its corresponding item number on the questionnaire.

The third step in constructing the research instrument was to place each statement on a five-point Likert scale. According to Kerlinger (1967) the Likert or summated rating scale allows "for the intensity of attitude expression"(p.484) and has the advantage of supplying a greater variance. The scores from each statement can be summed and averaged to produce a score for each problem statement.

The description of the scale was a modification of the one used by Milne (1968). Milne's "No problem" measure was changed to read "Very easy to solve" with a scaling value of 1 given to this category.

At the opposite end of the scale the "Extremely difficult" category was given a value of 5.

TABLE 1

GROUPING OF QUESTIONNAIRE STATEMENTS INTO MAJOR PROBLEM CATEGORIES

Major problem category	Statement number on questionnaire	Total number of statements
A. Administrative routine	1, 10, 20, 29, 30, 43, 54, 55, 64, 69, 75, 79, 88	13
B. Teaching methodology	3, 11, 18, 21, 23, 37, 38, 45, 57, 61, 71, 76, 85, 90, 95, 96, 98, 100	18
C. Curriculum	4, 9, 12, 19, 26, 33, 42, 53, 58, 68, 73, 82, 87	13
D. Evaluation	5, 8, 28, 34, 44, 48, 59, 67, 72, 80, 84, 89	12
E. Professional development	6, 13, 16, 25, 36, 40, 49, 52, 62, 70, 74, 81, 86, 94, 99	15
F. Aids, materials and resources	7, 15, 17, 27, 31, 39, 50, 51, 56, 60, 65, 76	12
G. Laboratory management	2, 14, 22, 24, 32, 35, 41, 46, 47, 63, 66, 78, 83, 91, 92, 93, 97	17
TOTAL		100

The final procedure in designing the questionnaire was to use it in a pilot study with individuals who would not be involved in the major

investigation. The purposes of the pilot study were to identify statements that were ambiguous and irrelevant, to determine a sequence pattern for statements and to obtain some idea of the ease of answering the research instrument by participants. Another purpose for conducting the pilot study was to establish a minimum and maximum time for completion of the questionnaire.

The results of the pilot study indicated that a number of statements had to be revised because of their ambiguity. Two statements were eliminated from the final form of the instrument and two were added. The respondents were also given the option of answering "Not relevant" if they felt that the statement did not represent a real problem in teaching industrial arts.

Population

When discussing the problems of beginning industrial arts teachers, this researcher wished to be very specific and have as few independent variables as possible. Consequently, a concise, well defined population of beginning industrial arts teachers was selected for the study. The initial procedure in establishing the population was to determine the industrial arts teachers who began teaching in 1971, 1972 and 1973 and were still teaching in 1974. A list of teachers beginning teaching in these years was obtained from the records of the Department of Education, Province of Alberta. Because the researcher wished to deal only with teachers trained at the University of Alberta, in the Department of Industrial and Vocational Education, a further screening procedure was necessary.

A list of the names of industrial arts students who were

enrolled in Ed. Practicum courses, both at the undergraduate degree level and the Professional Diploma After Degree (PD/AD) level, for the years 1970-1974 was obtained from the Division of Field Experiences, The University of Alberta. This list was used in conjunction with the list of industrial arts teachers obtained from the Department of Education to obtain a population common to both lists. In [illegible]ew cases the student teaching records were incomplete. Where reasonable doubt existed, the person was included in the population to be studied. The selection procedure yielded 72 participants for the study.

Administering the Questionnaire

Prior to mailing the questionnaire, correspondence was initiated with superintendents of all the school divisions, counties or districts selected for the study. The purpose of this correspondence was to ask permission to survey beginning industrial arts teachers in their employ. With the exception of two school districts the requested permission was readily granted. The remaining two superintendents recommended that the request for participation be submitted through the Division of Field Experiences (see Appendix A). This is the normal procedure for involving the teachers of large urban centers in educational research.

The final form of the questionnaire was sent to each of the 72 industrial arts teachers selected to participate in the study. Included in the mailing was a personal data sheet and a covering letter explaining the purpose of the research and asking the teacher to participate in the study. Sample copies of these materials are included in Appendix B. Each participant also received a self-addressed stamped envelope in which to return the completed questionnaire.

Participants who had not returned their completed questionnaires by the established deadline were sent a follow-up letter (see copy in Appendix C). Those who still had not returned the questionnaire at the end of two weeks were contacted personally or by telephone. Using this procedure, a return objective of 85 percent was realized.

Analysis of Data

Before the data on the returned questionnaires were analyzed, the questionnaires were inspected to determine whether the participants met the criteria for being part of the population. If the respondent did not receive his teacher training at The University of Alberta, if he did not have student teaching in industrial arts or if he was not teaching industrial arts subjects more than 50 percent of the time, his questionnaire was eliminated from the sample of returned questionnaires.

The data from the screened questionnaires were placed onto IBM punched cards as an initial stage in processing. The next step was to subject the responses to the 100 problem statements to a descriptive statistics program from the library of the Division of Educational Research Services in the Faculty of Education. This program yielded means, standard deviations, variances, correlations, and summaries of all the responses of the whole sample on each of the 100 problem statements.

To analyze the 10 independent variables, the original punched cards were resorted and duplicated to produce 10 individual decks representing each of the 10 variables. The same Division of Educational Research Services program was then applied to the data for each independent variable and means, standard deviations, variances, and

correlations were obtained for each variable.

An additional program had to be created to produce correlations of the means of 100 problem statements for each of the 10 independent variables.

When the data were initially analyzed, a decision was made to use only the 20 most difficult problems for a detailed analysis and comparison. The figure of 20 would satisfy the research objectives and would make analysis, comparison and conclusions more efficient.

The data for the 20 most difficult problems were then tabulated for all beginning industrial arts teachers who were in the accepted sample and for the 10 independent variables. Additional tables, containing distribution of means, categorization of problem statements, and correlations of the 10 independent variables were constructed.

CHAPTER IV

ANALYSIS OF DATA

The previous chapter outlined the procedure followed in constructing the research instrument used to collect relevant data for the study. In this chapter these data will be tabulated for the most difficult problems for each group based on each of the four independent variables. These problems will be categorized and distributions and correlations of means determined. At the end of this chapter will be found a list of the comments made by some of the participants.

It should be pointed out that because this study was primarily descriptive, no hypotheses are being tested and no statistical inferences are to be drawn from these data.

RETURN OF QUESTIONNAIRES

A total of 72 questionnaires were sent to beginning industrial arts teachers in Alberta. Of the 72 mailed, 61 were returned, establishing a return of 85 percent.

Information in Table 2 indicate that nine of the 61 returned questionnaires were rejected. The reasons for rejecting theses questionnaires are presented in the data that form Table 3. These questionnaires were rejected because participants who completed them did not meet the criteria established for the population for the study. Considering the nine rejected questionnaires, an 85 percent return was realized.

TABLE 2

NUMBER OF QUESTIONNAIRES MAILED, RETURNED,

AND ACCEPTED IN THE STUDY

Number mailed	Number returned	Percent returned	Number rejected	Number accepted	Percent accepted	
					of total	of returned
72	61	85	9	52	72	85

TABLE 3

REASONS FOR REJECTING

NINE QUESTIONNAIRES

Reason for rejecting questionnaire	Number rejected	Number returned	Percent of returns rejected
Training was not at The University of Alberta	7	61	11.5
Insufficient industrial arts training	2	61	3.5

Description of Sample Accepted

Data in Table 4 summarize responses made by participants to the personal information sheet that accompanied the questionnaire. The most significant figures in this table are those that describe the size of each of the 10 groups that comprise the four independent variables. These independent variables were years of teaching, type of school, type of community, and type of industrial arts teacher training. The

sample of high school industrial arts teachers is small with an N of 4 or 8 percent of those who were accepted for the study. Because of this small number, care must be taken when analyzing the data and drawing conclusions.

TABLE 4

DESCRIPTION OF SAMPLE ACCEPTED

Information from data sheet		Number	Percent
Years of teaching industrial arts -			
	1	20	38.5
	2	20	38.5
	3	12	23.0
	more	0	-
Type of teaching experience -			
	Junior high	25	48.0
	Senior high	4	8.0
	Junior and senior high	23	44.0
Population of community -			
	Less than 5,000	25	48.0
	More than 5,000	27	52.0
Number of full years teacher education in industrial arts -			
	1	7	13.5
	2	0	-
	3	5	9.6
	4	39	75.0
	more	1	1.9
Percentage time teaching industrial arts subjects -			
	more than 50 percent	52	100.0
	less than 50 percent	0	-
Degree -			
	B.Ed. (I.A.)	39	75.0
	B.Ed. (Voc.Ed.)	1	1.9
	Other	0	-
	Graduate degree	0	-
	PD/AD	5	9.6
	No degree	5	9.6
	Other university degree	4	7.7
	Non-B.Ed. (I.A.)	13	25.0

TABLE 4 (continued)

Information from data sheet	Number	Percent
Industrial arts courses taken -		
203	52	100.0
260	52	100.0
270	51	98.0
350	47	90.0
360	43	82.0
370	45	86.0
460	43	82.0
470	45	86.0
Other	0	-
Student teaching in industrial arts -		
Yes	52	100.0
No	0	-

Participants who make up the third year group and those who make up the group lacking a B.Ed. in Industrial Arts are also small in number (N=12 and N=13 respectively). These two groups each represent 23 percent of those who were part of the accepted sample of returned questionnaires.

A study of the number of full years of teacher education indicates that 39 of the participants had completed four years of university. This represents 75 percent of those who comprised the research sample. Thirteen or 25 percent of the teachers who were the research sample of the study had no degree. The remaining data in this table are self-explanatory.

The primary objective of this study was to determine the most difficult problems for industrial arts teachers in their initial years of teaching. Table 5 lists the 20 most difficult problems for all teachers in their initial years of teaching. These problem statements

are listed in rank order of difficulty. For the purpose of ranking, the standard deviation was used to break ties in means. The smaller the standard deviation, the higher the rank. This procedure was used in all tables where ties occurred in ranking.

TABLE 5

TWENTY MOST DIFFICULT PROBLEMS OF THE STUDY PARTICIPANTS' INITIAL YEARS OF TEACHING (N=52)

No.	Problem statement	Category[(a)]	Rank	Mean	Standard deviation
15	Sources of instructional aids for teaching industrial arts	A.M.R.	1	3.38	.92
44	Knowledge of procedures for establishing reliability and validity in tests	E	2	3.35	1.11
77	Knowing where field trips are accepted by industry	A.M.R.	3	3.21	1.04
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	4	3.21	1.14
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	5	3.19	.88
28	Awareness of methods of self-evaluation	E	6	3.17	.64
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	7	3.15	1.97
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	8	3.13	.97
80	Awareness of methods of measuring student progress in the cognitive domain	E	9	3.11	.71

TABLE 5 (continued)

No.	Problem statement	Category[(a)]	Rank	Mean	Standard deviation
30	Establishing an effective system for inventory of equipment or supplies	A.R.	10	3.11	.79
34	Awareness of methods of program evaluation	E	11	3.11	.79
39	Constructing your own visual classroom aids	A.M.R.	12	3.11	.94
51	Knowing where to get good films, slides, etc.	A.M.R.	13	3.11	1.02
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	14	3.11	1.21
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	15	3.11	1.37
60	Obtaining outside resource people to talk to students	A.M.R.	16	3.10	1.50
67	Measuring student progress in the affective domain	E	17	3.06	.97
31	Knowing what books to get for library and lab	A.M.R.	18	3.05	.86
14	Integrating instructional material and aids into the lab activities	L.M.	19	3.03	.61
83	Prevent wasting of materials	L.M.	20	3.02	1.17

(a) Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

Data in Table 5 show the mean difficulty of the 20 most difficult problems ranges between "Very difficult" and "Somewhat difficult". The highest mean for the number and ranked category is 3.38, so would skew the distribution of the 20 means towards the "Somewhat difficult" end. The median of the means being 3.00 would indicate that, although beginning industrial arts teachers experience numerous problems, the magnitude of these problems is central on the scale of difficulty.

The 20 most difficult problems of beginning industrial arts teachers in this sample appear to be very diverse. Of the statements with the highest 10 means in Table 5, six of the seven major categories are represented. Laboratory management is the only category not included in these 10 statements. Examining the 20 most difficult statements, all of the seven major categories were included, with aids, materials and resources, evaluation, and curriculum problems being the most numerous (seven, four and three in number respectively). Administrative routine, teaching methodology and professional development are least difficult problem categories.

ANALYSIS OF INDEPENDENT VARIABLES

The secondary objectives, stated in Chapter I, were to find the most difficult problems for the independent variables - "years of teaching", "type of teaching experience", "type of community", and "type of training".

A summary of the 20 most difficult problem statements for first year industrial arts teachers is given in Table 6. These problem statements are rank ordered according to mean and standard deviation, with the problem category also listed.

TABLE 6

TWENTY MOST DIFFICULT PROBLEMS FOR INDUSTRIAL ARTS TEACHERS IN THEIR FIRST YEAR OF TEACHING (N=20)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	1	3.60	.82
44	Knowledge of procedures for establishing reliability and validity in tests	E	2	3.50	1.00
38	Using the conference method of teaching	T.M.	3	3.50	1.40
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	4	3.45	1.10
5	Knowledge of aptitude tests and their application	E	5	3.45	1.50
80	Awareness of methods of measuring student progress in the cognitive domain	E	6	3.35	.74
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	7	3.30	1.00
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	8	3.25	1.20
15	Sources of instructional aids for teaching industrial arts	A.M.R.	9	3.20	.69
14	Integrating instructional material and aids into the lab activities	L.M.	10	3.20	.76

TABLE 6 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
28	Awareness of methods of self-evaluation	E	11	3.20	.76
30	Establishing an effective system for inventory of equipment or supplies	A.R.	12	3.20	.95
60	Obtaining outside resource people to talk to students	A.M.R.	13	3.20	1.05
77	Knowing where field trips are accepted by industry	A.M.R.	14	3.20	1.05
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	15	3.20	1.10
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	16	3.20	1.20
39	Constructing your own visual classroom aids	A.M.R.	17	3.15	.74
67	Measuring student progress in the effective domain	E	18	3.15	.81
31	Knowing what books to get for library and lab	A.M.R.	19	3.15	.98
34	Awareness of methods of program evaluation	E	20	3.15	.98

(a) Legend of category abbreviations
- A.M.R. - Aids, Materials and Resources
- E - Evaluation
- C - Curriculum
- T.M. - Teaching Methodology
- P.D. - Professional Development
- A.R. - Administrative Routine
- L.M. - Laboratory Management

The means for the first year teachers range between "Very difficult" and "Somewhat difficult" on the scale of difficulty. The highest mean of the 20 most difficult problems is 3.60 and the lowest is 3.15, the median being 3.20. Although most of the means are found towards the "Somewhat difficult" range of the scale, they are generally higher than the means for the 20 most difficult problems for the entire sample (see Table 5). Higher means for the first year teachers would be expected because of the lack of teaching experience.

The categories of problems for the first year group are not so diverse as they are for the entire sample. Seventeen of the 20 most difficult problems for first year teachers fall into four of the seven major categories - teaching methodology, curriculum, evaluation, and aids, materials and resources. Evaluation and aids, materials and resources are the most difficult, each representing six of the problem statements. An inspection of the 20 most difficult problems identified in this table show that all seven of the major categories are represented with administrative routine, teaching methodology, and laboratory management the least mentioned. An additional observation of the data shows that, although teaching methodology problems are few, they are first and third ranked. There are three curriculum problems included in the top 10 of the 20 most difficult problems, but none are included in the lower 10.

To summarize the 20 most difficult problems for second year teachers, Table 7 was designed. Since the respondents making up the second year group were asked to include their first year of teaching in their perception of beginning problems, problem statements in Table 7

TABLE 7

TWENTY MOST DIFFICULT PROBLEMS FOR INDUSTRIAL ARTS TEACHERS IN SECOND YEAR OF TEACHING (N=20)

No.	Problem Statement	Category[a]	Rank	Mean	Standard deviation
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	1	3.54	1.31
30	Establishing an effective system for inventory of equipment or supplies	A.R.	2	3.29	.86
15	Sources of instructional aids for teaching industrial arts	A.M.R.	3	3.25	1.11
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	4	3.20	.89
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	5	3.20	1.10
77	Knowing where field trips are accepted by industry	A.M.R.	6	3.15	.81
44	Knowledge of procedures for establishing reliability and validity in tests	E	7	3.15	.87
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	8	3.15	1.08
17	Getting and using good career information	A.M.R.	9	3.10	.91
51	Knowing where to get good films, slides, etc.	A.M.R.	10	3.10	.96

TABLE 7 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
8	Establishing a grading system	E	11	3.10	1.11
39	Constructing your own visual classroom aids	A.M.R.	12	3.05	1.31
28	Awareness of methods of self-evaluation	E	13	3.00	.56
97	Organizing class time for marking projects and recording student progress and activity	L.M.	14	3.00	.64
100	Understanding how students learn	T.M.	15	3.00	.64
94	Keeping up with new ideas in industrial arts	P.D.	16	3.00	.91
72	Awareness of the availability of standardized achievement tests	E	17	3.00	1.12
6	Finding and reading up-to-date professional literature	P.D.	18	3.00	1.21
60	Obtaining outside resource people to talk to students	A.M.R.	19	3.00	1.23
38	Using the conference method of teaching	T.M.	20	3.00	1.45

(a) Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

are a composite of first and second year teaching problems. In making comments about similarities and differences between first and second year teachers one must give consideration to the way in which respondents were asked to respond to the questionnaire. Data in Table 7 illustrate that there was as much diversity of the 20 most difficult problems for second year teachers as there was for first year teachers. Second year teachers have more problems in the category "Professional development" and fewer in the area "Evaluation". The means for the 20 most difficult problems for this group range from 3.54 to 3.00 and have a median of 3.10. The means for second year teachers are slightly less than those of first year teachers for the 20 most difficult problems. The lower means for second year teachers might be expected because they have had a year of teaching in which to find solutions to problems they identified in their first year of teaching.

Interestingly, a professional development problem ranked first by the second year teachers. In the first year group and in the entire sample, professional development ranked 16 and 17, respectively.

To summarize the 20 most difficult problems for industrial arts teachers in their third year of teaching, Table 8 was organized. Data in this table show a rank order of the statements as well as means and standard deviations for each problem statement. The problem statements of teachers in their third year of teaching are an accumulation of problems in their first, second and third years of teaching.

The means for the 20 most difficult problems for this group range between 3.91 and 3.00, with a median of 3.25. This median is higher than that of the first year (3.20) and the second year (3.10) teachers.

TABLE 8

TWENTY MOST DIFFICULT PROBLEMS FOR INDUSTRIAL ARTS TEACHERS

IN THIRD YEAR OF TEACHING (N=12)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
15	Sources of instructional aids for teaching industrial arts	A.M.R.	1	3.91	.99
4	Awareness of methods of program evaluation	E	2	3.50	.67
84	Formulating standards of performance to be expected of students	E	3	3.41	.79
28	Awareness of methods of self-evaluation	E	4	3.41	1.16
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	5	3.41	1.37
44	Knowledge of procedures for establishing realibility and validity in tests	E	6	3.41	1.44
77	Knowing where field trips are accepted by industry	A.M.R.	7	3.30	1.40
8	Establishing a grading system	E	8	3.25	.86
51	Knowing where to get good films, slides, etc.	A.M.R.	9	3.25	1.13
68	Understanding the overall philosophy, aim and objectives of public education	C	10	3.25	1.13
67	Measuring student progress in the effective domain	A.M.R.	11	3.25	1.35
39	Constructing your own visual classroom aids	A.M.R.	12	3.16	.71

TABLE 8 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
31	Knowing what books to get for library and lab	A.M.R.	13	3.16	.93
59	Awareness of methods of measuring student progress in the psychomotor domain	E	14	3.16	.93
80	Awareness of methods of measuring student progress in the cognitive domain	E	15	3.10	.79
14	Integrating instructional material and aids into the lab activities	L.M.	16	3.00	.60
97	Organizing class time for marking projects and recording student progress and activity	L.M.	17	3.00	.85
3	Assisting students in recognizing their abilities, aptitudes and interests	T.M.	18	3.00	1.04
17	Getting and using good career information	A.M.R.	19	3.00	1.12
41	Locating and organizing supplies	L.M.	20	3.00	1.12

[a] Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

The 20 most difficult problem statements for third year teachers are less diverse than for teachers in their first and second years of teaching. Third year teachers list no problems in administrative

routine or professional development among their 20 most difficult. Eighteen of these 20 most difficult problems can be placed in three of the seven major categories: evaluation, aids, materials and resources, and laboratory management. Although the heavy concentration of problems in these three areas is universal throughout the sample, it is more evident among teachers in their third year of teaching. The problems of these teachers are different from those of the first and second year teachers. Nine of the 20 most difficult problems identified by teachers in their first and second year of teaching were not classified as such by third year teachers.

Data in Table 9 summarize the distribution of means for the 100 problem statements for the variable "year of teaching". These data illustrate the differences in difficulty the different years of teaching groups had on the 100 problem statements. Using a mean greater than or equal to 3.00 as an arbitrary cut-off point, first year teachers had greater difficulty than did their counterparts with two years of teaching. Third year teachers had 31 problem statements whose mean was greater than or equal to 3.00, while first year teachers had 26, and second year teachers 21 means above the cut-off point.

Data in Table 9 indicate that third year teachers had more problems in the "Somewhat difficult" to "Very difficult" range than other teachers in the study. It is possible that third year teachers have a greater insight into their problems than do first and second year teachers. Another possibility is that problems faced by third year teachers are cumulative from their first and second year of teaching.

The information from Table 10 indicates a consistent concentration of problems in the major categories of evaluation and of aids,

TABLE 9

DISTRIBUTION OF MEANS FOR 100 PROBLEM STATEMENTS

COMPARED TO YEAR OF TEACHING

Year of teaching	(a) $\bar{X} \geq 3.0$	$2.5 \leq \bar{X} \leq 2.9$	$2.0 \leq \bar{X} \leq 2.4$	$0 \leq \bar{X} \leq 1.9$
First year teachers (N=20)	26	36	32	6
Second year teachers (N=20)	21	42	30	7
Third year teachers (N=12)	31	44	20	5

(a) Mean

TABLE 10

MAJOR CATEGORIES OF THE 20 MOST DIFFICULT PROBLEM STATEMENTS

FOR THE YEAR OF TEACHING VARIABLE

Years of teaching	Major category						
	Administrative routine	Teaching methodology	Curriculum	Evaluation	Professional development	Aids, materials & resources	Lab management
First	1	2	3	6	1	6	1
Second	1	2	3	4	3	6	1
Third	0	1	1	7	0	8	3

materials and resources. For all the groups the fewest problems that were identified were in the administrative routine, teaching methodology, professional development, and laboratory management categories. Data in this table also show that the degree of difficulty in the categories of evaluation and of aids, materials and resources increases with years of teaching. The categories of administrative routine and professional development decrease with years of teaching.

Data in Table 11 show the correlations of means for all 100 problem statements for each of the three years of teaching. These data illustrate that the second and third year teachers agree on teaching problems more than any other combination with a correlation of .790. First and third year teachers agree on the problems they face as teachers with a correlation of .703. The first and second year teachers are in least agreement as to teaching problems with a correlation of .696.

TABLE 11

CORRELATION OF 100 MEANS FOR

YEAR OF TEACHING VARIABLE

Year of teaching	1	2	3
1	-	.696	.703
2	.696	-	.790
3	.702	.790	-

Table 12 was assembled in order to summarize the 20 most difficult problems for junior high industrial arts teachers. Data in this table are listed according to the category, rank, mean, and standard deviation for each statement. The means for the 20 most difficult problems for beginning junior high school industrial arts teachers range from 3.68 to 3.12, with a median of 3.20. The median for the entire sample was 3.11 (see Table 5). Problems of junior high school teachers appear to be more difficult than the problems of the entire sample.

Problems for beginning junior high industrial arts teachers lie heavily in the evaluation category with nine of the top 20 problems in this category. Aids, materials and resources is the next in difficulty with all other major categories comparatively low in frequency. There were no problems in laboratory management for teachers who were beginning their teaching career in a junior high school industrial arts laboratory.

The 20 most difficult problem statements for beginning industrial arts teachers who taught in a senior high school are presented in Table 13. The number of respondents in this group is small (four) and problems for this group deviate significantly from both the other groups and from the entire sample. The means for this group range from 4.00 to 3.00, with a median of 3.00.

The senior high school teacher's problems were concentrated in the areas of administrative routine and laboratory management. The size of high schools, and the industrial arts laboratories in them, may be factors contributing to this situation. Table 13 also shows that sneior high school beginning industrial arts teachers have identified very few evaluation problems.

TABLE 12

TWENTY MOST DIFFICULT PROBLEM STATEMENTS FOR JUNIOR HIGH BEGINNING INDUSTRIAL ARTS TEACHERS (N=25)

No.	Problem Statement	Category[a]	Rank	Mean	Standard deviation
44	Knowledge of procedures for establishing reliability and validity in tests	E	1	3.68	.85
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	2	3.44	1.12
77	Knowing where field trips are accepted by industry	A.M.R.	3	3.40	.95
5	Knowledge of aptitude tests and their application	E	4	3.40	1.47
80	Awareness of methods of measuring student progress in the cognitive domain	E	5	3.28	.67
28	Awareness of methods of self-evaluation	E	6	3.24	.73
37	Finding techniques for development student respect for tools, materials, etc.	T.M.	7	3.24	1.01
34	Awareness of methods of program evaluation	E	8	3.20	.57
59	Awareness of methods of measuring student progress in the psychomotor domain	E	9	3.20	.64
30	Establishing an effective system for inventory of equipment or supplies	A.R.	10	3.20	.85
15	Sources of instructional aids for teaching industrial arts	A.M.R.	11	3.20	.95

TABLE 12 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	12	3.20	1.04
38	Using the conference method of teaching	T.M.	13	3.20	1.29
3	Assisting students in recognizing their abilities, aptitudes and interests	T.M.	14	3.16	.55
39	Constructing your own visual classroom aids	A.M.R.	15	3.16	.85
67	Measuring student progress in the affective domain	E	16	3.16	.89
8	Establishing a grading system	E	17	3.16	.94
6	Finding and reading up-to-date professional literature	P.D.	18	3.16	.98
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	19	3.16	1.10
11	Finding methods of assisting students in developing good work habits, social attitudes and leadership qualities		20	3.12	.52

[a] Legend of category abbreviations
A.M.R. - Arts, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

TABLE 13

TWENTY MOST DIFFICULT PROBLEM STATEMENTS FOR SENIOR HIGH BEGINNING INDUSTRIAL ARTS TEACHERS (N=4)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	1	4.00	0
22	Finding ways of beginning instruction or lab work promptly	L.M.	2	3.75	.83
30	Establishing an effective system for inventory of equipment or supplies	A.R.	3	3.50	.50
94	Keeping up with new ideas in industrial arts	P.D.	4	3.50	.86
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	5	3.50	1.11
24	Knowing how to select proper lab equipment	L.M.	6	3.25	.43
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	7	3.25	.89
41	Locating and organizing supplies	L.M.	8	3.25	.83
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	9	3.00	0
83	Prevent wasting of materials	L.M.	10	3.00	0
28	Awareness of methods of self-evaluation	E	11	3.00	.50

TABLE 13 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
11	Finding methods of assisting students in developing good work habits, social attitudes and leadership qualities	T.M.	12	3.00	.70
14	Integrating instructional material and aids into the lab activities	P.D.	13	3.00	.70
20	Handing out supplies and equipment to students	A.R.	14	3.00	.70
51	Knowing where to get good films, slides, etc.	A.M.R.	15	3.00	.70
2	Organization and placement of equipment to facilitate easy and safe operation	L.M.	16	3.00	1.00
15	Sources of instructional aids for teaching industrial arts	A.M.R.	17	3.00	1.00
10	Developing an effective system of checking tools and equipment and clean-up	A.R.	18	3.00	1.20
29	Establishing a good system for lending equipment or reference material	A.R.	19	3.00	1.20
1	Developing an effective system for recording attendance	A.R.	20	3.00	1.50

[a] Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

In the major categories of curriculum and professional development only two problems for each category were identified in the top 20 most difficult problems. These two statements for each of the categories ranked in the 10 most difficult.

Although administrative routine and laboratory management problems are found in equal number in the 20 most difficult, there is only one administrative routine problem in the top 10 most difficult. There were three laboratory management problems in the 10 most difficult.

Table 14 lists the 20 most difficult problems for beginning industrial arts teachers who teach in both a junior and senior high school setting. The 20 most difficult problems for this group have means ranging between 3.61 and 3.00, with a median of 3.08. This median is lower than the junior high teachers (3.20) and slightly higher than senior high teachers (3.00). The problems for this group of teachers are diverse with all seven categories included in the 20 most difficult problems and six out of seven major categories represented in the top 10 ranked problems. Observation of the category column of Table 14 shows that the most difficult problems faced by teachers in this group can mainly be categorized into aids, materials and resources, evaluation, and curriculum. These three categories represent 14 of the 20 problem statements. Teaching methodology and professional development are fewest in number, each with just one problem statement in the 20 most difficult.

Distributions for the means of the 100 problem statements for each type of teaching experience are given in Table 15. The data in Table 15 show that the senior high school teachers had the fewest

TABLE 14

TWENTY MOST DIFFICULT PROBLEM STATEMENTS FOR BEGINNING INDUSTRIAL ARTS TEACHERS WHO TEACH IN BOTH JUNIOR AND SENIOR HIGH SCHOOL (N=23)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
15	Sources of instructional aids for teaching industrial arts	A.M.R.	1	3.61	.98
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	2	3.48	1.20
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	3	3.20	1.62
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	4	3.17	.93
31	Knowing what books to get for library and lab	A.M.R.	5	3.17	1.03
83	Prevent wasting of materials	L.M.	6	3.17	1.03
17	Getting and using good career information	A.M.R.	7	3.17	1.15
77	Knowing where field trips are accepted by industry	A.M.R.	8	3.17	1.15
39	Constructing your own visual classroom aids	A.M.R.	9	3.13	.96
28	Awareness of methods of self-evaluation	E	10	3.08	.94
51	Knowing where to get good films, slides, etc.	A.M.R.	11	3.08	.97

TABLE 14 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	12	3.08	1.34
60	Obtaining outside resource people to talk to students	A.M.R.	13	3.08	1.47
30	Establishing an effective system for inventory of equipment or supplies	A.M.	14	3.04	.82
68	Understanding the overall philosophy, aim and objectives of public education	C	15	3.04	.97
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	16	3.04	1.22
14	Integrating instructional material and aids into the lab activities	L.M.	17	3.00	.82
54	Administrative procedures for dealing with problem students	A.R.	18	3.00	1.06
67	Measuring student progress in the affective domain	E	19	3.00	1.12
44	Knowledge of procedures for establishing reliability and validity in tests	E	20	3.00	1.16

(a) Legend of category abbreviations
- A.M.R. - Aids, Materials and Resources
- E - Evaluation
- C - Curriculum
- T.M. - Teaching Methodology
- P.D. - Professional Development
- A.R. - Administrative Routine
- L.M. - Laboratory Management

problems (22) with a mean greater than or equal to 3.00 and had the fewest means that were less than 1.9. The junior high teachers and the teachers who taught both junior and senior high school were similar in all categories except that the junior high school group had more means greater than or equal to 3.00.

TABLE 15

DISTRIBUTION OF MEANS FOR 100 PROBLEM STATEMENTS COMPARED TO TYPE OF TEACHING EXPERIENCE

Teaching experience	$\bar{X}$≥3.0 [(a)]	2.5≤$\bar{X}$<2.9	2.0≤$\bar{X}$<2.4	0<$\bar{X}$<1.9
Junior high	28	36	29	6
Senior high	22	51	25	2
Junior and senior high	23	39	32	6

(a) Mean

Table 16 is a summary of the categories for the 20 most difficult problems identified by participants in the study. Data from Table 16 show that junior high school teachers identified more problems in the "Evaluation" category than those in the other two groups. "Aids, materials and resources" was considered a problem area by participants in all groups. Junior high school teachers identified more problems in the curriculum category than respondents in the other two groups.

Data from the table also show that senior high school teachers had more problems in both the "Administrative routine" and "Professional development" categories.

TABLE 16

MAJOR CATEGORIES FOR 20 MOST DIFFICULT PROBLEM STATEMENTS

FOR TYPE OF TEACHING VARIABLE

Years of teaching	Major category						
	Administrative routine	Teaching methodology	Curriculum	Evaluation	Professional development	Aids, materials & resources	Lab management
Junior high	1	4	2	9	1	5	0
Senior high	5	1	2	1	3	3	5
Junior and senior high	2	1	4	4	1	6	2

Data from Table 17 give the correlations of the means of the 100 problem statements for the independent variable "Type of teaching experience". The junior high school teachers and those participants who taught both junior and senior high school are highly correlated with a correlation of .795. The junior high school teachers and the senior high school teachers are least correlated with a correlation of .244.

Another measure of agreement can be made by comparing the data in Tables 12, 13 and 14. Those who taught both junior and senior high school had only nine problems in common with junior high school teachers and nine again with senior high school teachers. Comparing junior high school industrial arts teachers with senior high school industrial arts

teachers, only six problems are found common to both groups.

TABLE 17

CORRELATIONS OF 100 MEANS FOR

TYPE OF TEACHING VARIABLE

Type of teaching	Junior high	Senior high	Junior and senior high
Junior high	-	.244	.795
Senior high	.244	-	.368
Junior and senior high	.795	.368	-

Table 18 is organized to present data that are directed at the 20 most difficult problems facing the industrial arts teacher in an urban setting. Also included in this table are the major categories for each problem statement - a rank order, the mean and standard deviation for each statement. The data in Table 18 show that the means for the 20 most difficult problems range from 3.48 to 3.07 with a median of 3.18. The problems of beginning industrial arts teachers in urban schools are concentrated in the categories of "Evaluation" and of "Aids, materials and resources". Teaching methodology, professional development and laboratory management were identified as three of the 20 most difficult problems listed in this table. The problems associated with laboratory management and professional development rank 18 and 20 respectively. Problems in the major category of "Evaluation" appear four times in the top 10 problems of this table.

TABLE 18

TWENTY MOST DIFFICULT PROBLEMS FOR BEGINNING INDUSTRIAL ARTS TEACHERS IN AN URBAN SETTING (N=27)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
44	Knowledge of procedures for establishing reliability and validity in tests	E	1	3.48	.93
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	2	3.44	1.01
80	Awareness of methods of measuring student progress in the cognitive domain	E	3	3.33	.67
28	Awareness of methods of self-evaluation	E	4	3.33	.73
15	Sources of instructional aids for teaching industrial arts	A.M.R.	5	3.33	.83
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	6	3.33	.91
77	Knowing where field trips are accepted by industry	A.M.R.	7	3.33	1.07
34	Awareness of methods of program evaluation	E	8	3.29	.66
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	9	3.22	1.12
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	10	3.18	1.17
5	Knowledge of aptitude tests and their application	E	11	3.18	1.52

TABLE 18 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
31	Knowing what books to get for library and lab	A.M.R.	12	3.15	.71
30	Establishing an effective system for inventory of equipment or supplies	A.R.	13	3.15	.98
60	Obtaining outside resource people to talk to students	A.M.R.	14	3.15	1.16
59	Awareness of methods of measuring student progress in the psychomotor domain	E	15	3.11	.69
72	Awareness of the availability of standardized achievement tests	E	16	3.11	1.21
11	Finding methods of assisting students in developing good work habits, social attitudes and leadership qualities	T.M.	17	3.07	.54
14	Integrating instructional material and aids into the lab activities	L.M.	18	3.07	.68
39	Constructing your own visual classroom aids	A.M.R.	19	3.07	1.10
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	20	3.07	1.38

[a] Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

Data in Table 19 describe the 20 most difficult problems faced by the beginning industrial arts teacher in a rural locale. Also in

TABLE 19

TWENTY MOST DIFFICULT PROBLEMS FOR BEGINNING INDUSTRIAL ARTS TEACHERS TEACHING IN RURAL SCHOOLS (N=25)

No.	Problem statement	Category[(a)]	Rank	Mean	Standard deviation
15	Sources of instructional aids for teaching industrial arts	A.M.R.	1	3.44	1.12
83	Prevent wasting of materials	L.M.	2	3.40	1.00
51	Knowing where to get good films, slides, etc.	A.M.R.	3	3.28	.93
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	4	3.28	1.33
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	5	3.24	1.48
44	Knowledge of procedures for establishing reliability and validity in tests	E	6	3.20	1.19
39	Constructing your own visual classroom aids	A.M.R.	7	3.16	.85
17	Getting and using good career information	A.M.R.	8	3.16	1.10
67	Measuring student progress in the affective domain	E	9	3.16	1.10
38	Using the conference method of teaching	T.M.	10	3.12	1.64

TABLE 19 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
97	Organizing class time for marking projects and recording student progress and activity	L.M.	11	3.08	.70
30	Establishing an effective system for inventory of equipment or supplies	A.R.	12	3.08	.81
77	Knowing where field trips are accepted by industry	A.M.R.	13	3.08	1.03
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	14	3.04	.97
41	Locating and organizing supplies	L.M.	15	3.04	.97
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	16	3.04	1.06
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	17	3.04	1.33
60	Obtaining outside resource people to talk to students	A.M.R.	18	3.04	1.39
68	Understanding the overall philosophy, aim and objectives of public education	C	19	3.04	1.71
84	Formulating standards of performance to be expected of students	E	20	3.00	.81

[a] Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

this table are the major categories in which each problem statement was placed, a rank order for each problem statement, the mean for each statement, and the standard deviation for each one. The means for this subgroup range from 3.44 to 3.00, with a median of 3.12. The median for this group is less than the median of the urban group (3.18). The problems of beginning industrial arts teachers working in rural schools are diverse; each of the seven categories is represented in the 20 most difficult problems. Six of the seven major categories are found among the 20 most difficult problems of Table 19. Teachers in this group have the least number of problems in the categories of "Administrative routine" and "Professional development". Four of the 10 major problems for this group are in the category of "Aids, materials and resources".

Table 20 was designed to show a distribution of the means for the 100 problem statements compared to the type of community in which

TABLE 20

DISTRIBUTION OF MEANS FOR 100 PROBLEM STATEMENTS COMPARED TO THE TYPE OF COMMUNITY

Type of community	$3 \leq \bar{X}$ [(a)]	$2.5 \leq \bar{X} \leq 2.9$	$2.0 \leq \bar{X} < 2.4$	$0 < \bar{X} \leq 1.9$
Urban	25	37	33	5
Rural	26	42	28	4

(a) Mean

the beginning industrial arts teacher was employed. Information in Table 20 shows that there is little difference between the urban and

rural industrial arts teachers for means greater than or equal to three. Teachers in the rural group had more problems, with means less than and equal to 2.9 and greater than and equal to 2.5.

Data in Table 21 outline the major categories of the 20 most difficult problem statements for the variable "Type of community". Information in this table shows that the categorization of problems for beginning industrial arts teachers in both urban and rural areas is similar for all categories with the exception of evaluation and laboratory management. Urban teachers identified more problems in evaluation and identified fewer problems in laboratory management than did rural teachers.

TABLE 21

MAJOR CATEGORIES FOR 20 MOST DIFFICULT PROBLEM STATEMENTS FOR TYPE OF COMMUNITY VARIABLE

Type of community	Major category						
	Administrative routine	Teaching methodology	Curriculum	Evaluation	Professional development	Aids, materials & resources	Lab management
Urban	1	2	2	7	1	6	1
Rural	1	2	3	3	0	7	3

Table 22 shows correlations for the means of all 100 problem statements for beginning industrial arts teachers who teach in rural and urban settings. A correlation of .780 was found between these two

TABLE 22

CORRELATIONS OF 100 MEANS FOR

TYPE OF COMMUNITY VARIABLE

Type of community	Urban	Rural
Urban	-	.780
Rural	.780	-

groups, which indicates there was some measure of agreement between them for a majority of problem statements.

A comparison of the 20 most difficult problem statements presented in Tables 18 and 19 shows that the urban and rural teachers identified only eight problems in common.

A summary of the 20 most difficult problems for beginning teachers who had a Bachelor of Education in Industrial Arts is presented in Table 23. Included in this summary is a rank order for those statements as well as a standard deviation for each problem statement. Means for the 20 most difficult problems range between 3.51 and 3.03, with a median of 3.15. Beginning industrial arts teachers with a degree in this field have a wide variety of problems: six of the seven major categories were identified in the 20 most difficult problems listed in the table. Professional development is the only category not found in the 20 most difficult problems. This group had most of its problems in the categories of evaluation and of aids, materials and resources. Statements in these categories represent 13 of the 20 most difficult

TABLE 23

TWENTY MOST DIFFICULT PROBLEMS FOR TEACHERS WITH A BACHELOR OF EDUCATION IN INDUSTRIAL ARTS (N=39)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
44	Knowledge of procedures for establishing reliability and validity in tests	E	1	3.51	1.07
15	Sources of instructional aids for teaching industrial arts	A.M.R.	2	3.38	.96
60	Awareness of methods of measuring student progress in the cognitive domain	E	3	3.25	.75
51	Knowing where to get good films, slides, etc.	A.M.R.	4	3.23	.87
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	5	3.23	1.18
67	Measuring student progress in the affective domain	E	6	3.20	.92
28	Awareness of methods of self-evaluation	E	7	3.17	.88
34	Awareness of methods of program evaluation	E	8	3.17	.88
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	9	3.17	1.12
31	Knowing what books to get for library and lab	A.M.R.	10	3.15	.98
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	11	3.15	1.01

TABLE 23 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
77	Knowing where field trips are accepted by industry	A.M.R.	12	3.15	1.13
39	Constructing your own visual classroom aids	A.M.R.	13	3.10	.78
30	Establishing an effective system for inventory of equipment or supplies	A.R.	14	3.10	.85
59	Awareness of methods of measuring student progress in the psychomotor domain	E	15	3.10	1.02
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	16	3.10	.85
8	Establishing a grading system	E	17	3.08	.92
14	Integrating instructional material and aids into the lab activities	L.M.	18	3.03	.74
97	Organizing class time for marking projects and recording student progress and activity	L.M.	19	3.03	.77
83	Prevent wasting of materials	L.M.	20	3.03	1.13

(a) Legend of category abbreviations
- A.M.R. - Aids, Materials and Resources
- E - Evaluation
- C - Curriculum
- T.M. - Teaching Methodology
- P.D. - Professional Development
- A.R. - Administrative Routine
- L.M. - Laboratory Management

problems that these teachers identified. For these teachers there are five evaluation problems in top 10 means.

In Table 24 are data which list the 20 most difficult problems for beginning industrial arts teachers who do not have a degree in this field. Data in this table also include the major category for each problem statement, a rank order for the means and a standard deviation for each statement.

Statements made about the problems of this group must take into consideration the diversity of the subgroups. The 13 teachers have differing qualifications and these may be studied in Table 3. All of the teachers in this group had fewer industrial arts courses than the people with a degree in industrial arts. The range of industrial arts courses that were completed by participants who make up this group was from 3.5 to 6.5 of a possible 7.5 courses.

An analysis of the data in Table 24 shows that the means for the 20 problems had a range from 3.69 to 2.92, with a median of 3.15. Studying the major category column reveals that the problems for this group are diverse. Of the seven major categories, six are in the top 10 most difficult problems identified in this table. The category of aids, materials and resources is the most difficult: five of the 20 problem statements fell into that category. This group had its fewest problems in administrative routine. Fourteen of the 20 most difficult problems are evenly distributed in the other five major categories.

Data in Table 25 present a distribution of means for the 100 problem statements compared to the type of teacher training. Information in this table shows that the teachers without a degree in

TABLE 24

TWENTY MOST DIFFICULT PROBLEMS FOR TEACHERS WITHOUT A BACHELOR OF EDUCATION IN INDUSTRIAL ARTS (N=13)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	P.D.	1	3.69	1.03
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	C	2	3.54	.96
77	Knowing where field trips are accepted by industry	A.M.R.	3	3.38	.76
15	Sources of instructional aids for teaching industrial arts	A.M.R.	4	3.38	1.04
37	Finding techniques for developing student respect for tools, materials, etc.	T.M.	5	3.30	.75
60	Obtaining outside resource people to talk to students	A.M.R.	6	3.30	1.25
38	Using the conference method of teaching	T.M.	7	3.23	1.69
28	Awareness of methods of self-evaluation	E	8	3.15	.55
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	C	9	3.15	.98
30	Establishing an effective system for inventory of equipment or supplies	A.R.	10	3.15	1.06

TABLE 24 (continued)

No.	Problem statement	Category[a]	Rank	Mean	Standard deviation
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	C	11	3.15	1.34
39	Constructing your own visual classroom aids	A.M.R.	12	3.15	1.46
14	Integrating instructional material and aids into the lab activities	L.M.	13	3.08	.95
94	Keeping up with new ideas in industrial arts	P.D.	14	3.08	1.03
18	Adapting teaching methods to consider individual differences of students	T.M.	15	3.08	1.11
72	Awareness of the availability of standardized achievement tests	E	16	3.08	1.32
83	Prevent wasting of materials	L.M.	17	3.00	1.00
65	Knowledge of T.V. or radio programs that can assist instruction	A.M.R.	18	3.00	1.29
35	Knowing how to make maximum and effective use of available equipment to meet the objectives of the course	L.M.	19	2.92	.86
34	Awareness of methods of program evaluation	E	20	2.92	.95

(a) Legend of category abbreviations
A.M.R. - Aids, Materials and Resources
E - Evaluation
C - Curriculum
T.M. - Teaching Methodology
P.D. - Professional Development
A.R. - Administrative Routine
L.M. - Laboratory Management

TABLE 25

DISTRIBUTION OF MEANS FOR 100 PROBLEM STATEMENTS COMPARED TO TYPE OF TRAINING

Training	$3 \leq \bar{X}$ [(a)]	$2.5 \leq \bar{X} \leq 2.9$	$2.4 \leq \bar{X} \leq 2.0$	$0 \leq \bar{X} \leq 1.9$
B.Ed. in Industrial Arts	27	33	25	5
Non-B.Ed. in Industrial Arts	18	33	33	6

(a) Mean

industrial arts identified five fewer problems that had a mean greater than or equal to 3.00. This figure is surprising because this group had less training in the field of industrial arts. This table would not support a theory that increased pre-service training leads to fewer initial problems.

Table 26 presents the distribution of the 20 most difficult problem statements within the seven major categories for the variable "Type of training". Information in this table shows that the problems of the teachers without a degree in industrial arts are more diverse than those of the teachers who have the degree. The non-degreed group had more problems in the categories "Teaching methodology", "Curriculum", and "Professional development", but fewer problems in the categories "Evaluation" and "Aids, materials and resources".

Table 27 is a correlation matrix of the means for the 100 problem statements with "Type of training" as the independent variable.

TABLE 26

MAJOR CATEGORIES FOR 20 MOST DIFFICULT PROBLEM STATEMENTS

FOR TYPE OF TRAINING VARIABLE

Type of training	Major category						
	Administrative routine	Teaching methodology	Curriculum	Evaluation	Professional development	Aids, materials & resources	Lab management
B.Ed. in Industrial arts	1	1	2	7	0	6	3
Non-B.Ed. in Industrial arts	1	3	3	3	2	5	3

TABLE 27

CORRELATIONS OF 100 MEANS FOR

TYPE OF TRAINING VARIABLE

Type of training	B.Ed. in Industrial Arts	Non-B.Ed. in Industrial Arts
B.Ed. in Industrial Arts	-	.449
Non-B.Ed. in Industrial Arts	.449	-

The correlation for the two groups is low, indicating little response agreement on the 100 problem statements.

A comparison of data in Tables 23 and 24 shows that 10 of the 20 most difficult problem statements are common to both groups.

Comments Made by Respondents

Following is a list of the relevant comments made by individual respondents on the returned questionnaires.

1. "It is very hard to get proper diagrams of machines for teaching. Could it be possible to get them and where? Also P.P.I.'s?"
   (P.P.I. is an acronym for Pictorial Programmed Instruction)

2. "I have been fortunate to be in a system which aims to get the new teacher settled into teaching with the least possible pain. The A.I.D. system newly introduced in the province is a boon to the new teacher in the lab. I hope to see more."
   (A.I.D. is an abbreviation for Articulated Instructional Development and is based on the principles of the P.P.I.)

3. "It is my humble opinion that experience alone is the best teacher, both for students and for their teachers. As one gains experience in his field many of the problems mentioned here cease to cause concern. I have learned more from 2 years experience than from 4 years university education, and I suspect this is the only way effective teaching techniques can be learned."

4. "I agree 100% with you in that there is very little effort or information available for beginning I.A. teachers. It's good to see a start."

5. "A lot of the 'easy to solve' responses could have been 'difficult' if I had not been in a multiple-teacher lab."

6. "The university should have concentrated on showing us projects which students can build. I think that the university should have concentrated more on skill development in all areas."

Additional Information

A table showing the response of the 52 participants in the study to each problem on the "Level of difficulty" scale is included in Appendix E. This table also lists the means and standard deviation for each statement. This table also summarizes the "Not relevant" choice permitted respondents. This category shows which problems teachers felt were not significant in teaching industrial arts.

A description of the data in this table would be too burdensome for this writing, but the inclusion of the table will give interested persons a detailed picture of the distribution of responses for any problem statement.

Appendix F is a list of the 20 least difficult problems for the entire sample. This list was included to add positive balance to the discussion of beginning teachers' problems. The list might also be used in any revision of the questionnaire in further research.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The final chapter of this thesis will contain a restatement of the original problem which has been of concern in this study. The major findings will be summarized and conclusions drawn. Recommendations will be made for the benefit of those who have an interest in this area of research and suggestions for further study will be offered.

SUMMARY

The Problem

The problem and primary objective of this study was to identify the most difficult problems perceived by industrial arts teachers in their initial years of teaching.

In addition to the primary objective six secondary objectives were to be achieved. Four of these objectives were to determine through analysis and comparison the most difficult problems as they relate to the following variables: years of teaching, type of teaching experience, size of community, and type of teacher training. Two other objectives were to categorize the problem statements and to ascertain the degree of difficulty for each of the independent variables.

Related Literature

A review of the available literature was made in order to support the contention that teachers do, in fact, have problems in their

initial years of teaching.

The literature revealed that there were studies completed and texts written on teachers' problems in general and the problems of industrial arts teachers in particular but none of these was immediately applicable to the research problem at hand. A review of previous studies failed to uncover an instrument that could be used in a study directed at the problems of beginning industrial arts teachers in Alberta.

The categories used to group problem statements were defined and supported by authorities in the area.

Methodology

A major part of the methodology was the design of an instrument to identify teacher difficulties. Two questionnaires used in previous studies were modified and combined to produce 100 problem statements representing seven categories of problems. A Likert scale was used to quantify the difficulty of the statements on the questionnaire. Before the questionnaire was used in the major study it was checked by a specialist in instrument design, revised and tried in a pilot study.

As a result of the pilot study changes were made in the research instrument before it was mailed to participants to collect data for the major study. Before the questionnaires were mailed, permission was secured from the superintendents or research coordinators of the school systems involved to include the 72 beginning industrial arts teachers in the study. Accompanying each questionnaire was a covering letter that explained the purpose of the study and the involvement of the participant.

Follow-up letters, personal visits or telephone calls were made to those who did not meet the requested submission deadline. This procedure yielded a return of 61 (85 percent) completed questionnaires. These questionnaires were sorted and checked and nine were rejected because they did not meet the established criteria. Fifty-two completed questionnaires were processed and analyzed.

The data from these questionnaires were electronically processed by Computing Services at The University of Alberta. These data were then tabulated, described, analyzed, and compared in order to realize the research objective.

Findings

Data collected with the research instrument revealed the following major findings.

1. The 20 most difficult problems for the entire sample of respondents had means that ranged between "Somewhat difficult to solve" and "Very difficult to solve" on the level of difficulty scale. The majority of the 20 most difficult problems were skewed to the "Somewhat difficult to solve" category.

2. The 20 most difficult problems for all beginning industrial arts teachers in the sample included all major categories of problems. Aids, materials and resources problems were most numerous and evaluation problems next in number. For the entire sample administrative routine, teaching methodology and professional development were least difficult.

3. An analysis of problems of beginning industrial arts teachers, using years of teaching as an independent variable showed some similarities and some differences. Teachers in their first, second and

third year of teaching were consistent in the high degree of difficulty they perceived for the problem statements that were placed in the categories of evaluation and of aids, materials and resources. This was especially true for the third year group of beginning industrial arts teachers.

Differences in this variable were found when analyzing the number of problem statements with means greater than or equal to 3.00 on the scale of difficulty. The second year group had fewer problems than the first year group, but the third year teachers had more problems in this range than the other two groups.

4. When using type of school as an independent variable to measure beginning industrial arts teaching problems significant variances are found. Whereas junior high school teachers and teachers of both junior and senior high find evaluation, and aids, materials and resources problems most difficult, senior high school industrial arts teachers find administrative routine and laboratory management problems more difficult. Those teachers who teach only junior high school industrial arts and those who teach both junior and senior high are in high agreement on the difficulty of problems.

5. A comparison of the 20 most difficult problems for urban industrial arts teaching with those of their rural counterparts shows some dissimilarities. Rural teachers have significantly fewer problems in the category of evaluation and more problems in laboratory management than urban teachers. Both groups have a high degree of difficulty with problems related to aids, materials and resources.

6. A study of the 20 most difficult problems of teachers with

a bachelor's degree in industrial arts compared to teachers without the degree revealed that the degreed teachers had a heavy concentration of problems in the categories of evaluation and of aids, materials and resources. The teachers without degrees in industrial arts also had problems in the "Aids, materials and resources" category but differed significantly from the degreed group in having a high concentration of problems in teaching methodology, curriculum and laboratory management.

An analysis of the means for all 100 problem statements indicates that those without a B.Ed. in Industrial Arts have fewer problems with means greater than or equal to 3.00 than those who have a B.Ed. in Industrial Arts.

7. Analysis by any group of independent variables produces consistent, high degree of difficulty in the evaluation category and the aids, materials and resources category.

CONCLUSIONS

From the research findings the following conclusion were drawn.

1. Although beginning industrial arts teachers indicated a wide variety of problems of a professional nature, the problems were not extremely difficult for them to solve.

2. For the entire sample of beginning industrial arts teachers most of the problems they identified as being most difficult were placed in the major categories of evaluation and of aids, materials and resources.

3. Third year industrial arts teachers perceive more problems than do teachers in their first or second year of teaching. Teachers

in their third year of teaching appear to have greater insight into their problems than do teachers in their first and second years.

4. Senior high school industrial arts teachers have problems that are quite different from teachers in a junior high school or junior-senior high school setting.

5. In studying the 100 problems of beginning junior high school industrial arts teachers we could predict problems that are similar to those faced by industrial arts teachers in a combined junior-senior high setting.

6. Urban and rural teachers in teaching industrial arts experience many problems of a differing nature. The problems of the urban teacher and the problems of the rural teacher should therefore be studied independently of one another.

7. Teachers without a Bachelor of Education in Industrial Arts experience a much wider variety of problems than those who have a baccalaureate degree.

8. The increased amount of university training in industrial arts at the undergraduate level does not result in the teacher having less difficulty in solving problems. A greater amount of university training may result in the teacher having a greater perception of problems in the classroom.

IMPLICATIONS AND RECOMMENDATIONS

The findings and conclusions of this study have implications for the following three groups: the Department of Industrial and Vocational Education of the University; the Provincial Department of Education; and the local school administrators.

The Department of Industrial and Vocational Education, The University of Alberta

The large number of problem statements in the major category of evaluation faced by beginning industrial arts teachers would imply that they have little background in methods of evaluation. More specifically, problems of evaluation were related to the establishment of validity and reliability for teacher-designed tests used for program evaluation and of methods used for self-evaluation.

When considering course requirements for industrial arts students, the Department of Industrial and Vocational Education should recommend a course in evaluation or test construction for its students.

Problems in the category of aids, materials and resources were considered difficult to solve by beginning industrial arts teachers. The Department of Industrial and Vocational Education should place more emphasis on this aspect of teaching in all its curriculum and instruction courses. Current lists of sources of instructional aids should be kept by the department and made available to students.

The Department of Industrial and Vocational Education might consider ways in which it can assist beginning teachers establish themselves either through pre-service training or in-service programs offered by the department on a non-credit basis. This department should consider conducting on-going research directed at the type of problems that graduates from the department face as beginning teachers.

The Provincial Department of Education

The Department of Education of the Province of Alberta has a role in developing in-service programs for the teachers of the province.

The findings of this research provide information about problems for beginning industrial arts teachers. These data should be studied by departmental personnel who have the responsibility for organizing in-service programs for beginning industrial arts teachers.

The Department of Education should establish a bank of aids, materials and resources that could be made available for use by all teachers. The bank could include both printed and non-printed material such as instruction sheets, pictorial programmed instruction materials, career information, machine drawings, films, film strips, slides, tapes (video and audio), product ideas, book lists and evaluations, tests, models, etc. These could be made available to the teacher on a loan basis or for photocopying.

Local School Administration

The results of this study indicate that beginning industrial arts teachers in their first, second and third year of teaching have few problems in administrative routine and teaching methodology. Orientation and induction programs offered by some school systems for beginning teachers should de-emphasize the time devoted to administrative routine and teaching methodology problems and deal more with aspects of evaluation. Local school systems could also do more to furnish instructional aids to teachers. Advances in teaching technology seem to exceed by far the outlay of money for purchasing new teaching aids. Additional money should also be found to pay teachers for summer writing time to prepare instructional aids that would be valuable to beginning teachers.

Recommendations for Further Study

This study was concerned with the problems of a very restricted population of beginning industrial arts teachers. Many of the new industrial arts teachers hired in the province each year have not received their training at The University of Alberta and because of criteria established for the study, were excluded from it. Other research may study the problems of all beginning industrial arts teachers. It is recommended that a research investigation be undertaken that would involve all industrial arts teachers in the initial years of teaching regardless of the location of their preparation. The purpose of such a study would be to compare teacher preparation as a variable in identifying teacher problems.

At the present time the Department of Industrial and Vocational Education is in the process of changing its course structure with provision for an extended practicum that would increase the amount of time the university students spend in the schools. It is recommended that a research study be undertaken to compare the problems of teachers in this study to the problems of beginning industrial arts teachers who had involvement in the extended practicum. The purpose of such a study as this would be to determine if teachers who had the practicum perceived the problems of teaching differently than those who did not.

One of the findings of this study was that as a teacher gained experience, the number of different problems that were perceived also showed an increase. It is recommended that this study be replicated with a large population that would include teachers in both their fourth and fifth years of teaching. The purpose of this study would be

to determine if the problems of industrial arts teachers in the fourth and fifth years of teaching are greater than those of teachers in their first, second or third year of teaching.

If the present study is to be replicated, the researcher may wish to revise the questionnaire in light of the "Not relevant" responses made to some items. To determine the amount of assistance a teacher received in his initial years of teaching, a means of measuring this assistance should be added to the questionnaire to compare the degree of difficulty to the amount or type of assistance given.

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APPENDIX A

This appendix includes a sample copy of the Cooperative Activities form of the Division of Field Experiences. This form is routed to the appropriate school official who grants permission to conduct research in the schools.

COOPERATIVE ACTIVITIES PROGRAM

1. Nature of Activity (Check one)

Student Teaching Internship _____ Demonstration/Experimentation _____

Special Practicum _____ Research X

2. Organization to be Involved

Edmonton Public School System X County of Strathcona X

Edmonton Separate School System X St. Albert Protestant/Separate

N.A.I.T. _____ School System X

U. of A. Faculty of _____ Other _____

3. Requestor (staff member)

Name Dr. C.H. Preitz Position Associate Professor Date May 3, 1974

Request made on behalf of Mr. David Ible

4. Description of Activity - Include title, objectives, procedure, evaluation techniques, etc.

Title: Problems of Beginning Industrial Arts Teachers

Objectives:
(1) To develop an instrument that will determine major problems experienced by beginning industrial arts teachers
(2) To identify major problems experienced by beginning industrial arts teachers in Alberta

Procedure: By means of a review of the available literature a questionnaire has been constructed to determine which problems beginning industrial arts teachers find most difficult to solve. The questionnaire has been subjected to a pilot study which determined the suitability, relevance and completeness of the items.

The revised questionnaire will be sent to approximately 70 beginning industrial arts teachers in Alberta. A beginning industrial arts teacher is defined as one who is in the first three years of teaching, has taken teacher education at The University of Alberta and has had student teaching in industrial arts.

The teachers will be asked to respond to 100 potential problems in terms of solvability on a five-point scale ranging from "Extremely difficult" to "No problem".

5. Anticipated value to requestor - The requestor serves as thesis advisor to Mr. Ible. The data collected will be used as part of a Master's thesis in Education at The University of Alberta.

6. Anticipated value to cooperating organization - The results of the study will be valuable to school systems that are concerned with giving assistance to industrial arts teachers in their beginning years of teaching.

7. Estimate of cost (see remuneration guidelines)

   None

8. Suggested personnel, schools and times -

   The personnel involved will be all industrial arts teachers who are in their first three years of teaching. The questionnaire takes approximately 15 minutes to answer.

For Office Use Only

Approved by _____ Division of Field Experiences Date _____

Approved by _____ Date _____

Subject to the following conditions:

(a) A report of the results of findings of this project is required by the cooperating school system (check one) yes X no ___

(b) Other

APPENDIX B

In this appendix can be found a sample copy of the correspondence mailed to superintendents of the various school jurisdictions asking them to cooperate in the study.

Also included is a sample copy of the reply form used by the superintendents.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION

EDMONTON, ALBERTA
CANADA

I would like to ask your permission to send a questionnaire to beginning industrial arts teachers in your system. I have been teaching industrial arts in Edmonton for seven years and I am completing my master's degree in the Department of Industrial and Vocational Education at The University of Alberta. I am writing a thesis titled "Problems of Beginning Industrial Arts Teachers". The thesis involves surveying all Alberta industrial arts teachers who have received their teacher education at The University of Alberta and who are in their first three years of teaching.

The questionnaire lists approximately 100 possible problems facing industrial arts teachers. The teacher is asked to respond to the problem in terms of solvability on a five-point Likert scale. The questionnaire does not ask about any personal problems or any problems relating to specific school situations and all responses are to be kept confidential. Recognizing that teachers' time is limited and that questionnaires are very popular in educational research, I have kept the questionnaire short (15 minutes) and simple to interpret and answer.

I believe that the information gained from the study will benefit not only to teacher training institutions but also to school systems. Should you permit me to include your school system in my study I will be pleased to send you a summary of the results when the thesis is complete.

Please reply by filling out the attached form and mailing it in the self-addressed and stamped envelope.

Thank you for considering my request.

Sincerely,

David Ible

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

EDMONTON, ALBERTA
CANADA

_____ My permission is granted to survey industrial arts teachers.

_____ My permission is not granted to survey industrial arts teachers.

_____ I would like to receive a summary of results of the study.

_____ I would like a copy of the questionnaire.

NAME _____

SCHOOL DIVISION OR COUNTY _____

_____

ADDRESS _____

_____

_____

APPENDIX C

A sample copy of the follow-up letter sent to participants who were late in submitting their research instrument is in this appendix.

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

EDMONTON, ALBERTA
CANADA

May 20, 1974

Several days ago you received a questionnaire concerning the problems of beginning industrial arts teachers. I have had encouraging returns from the majority of the participants, but I have not yet received your questionnaire.

I realize that you are very busy at this time of year and have probably had to answer many other questionnaires, but I hope that you can see the value of the information that I am trying to collect, and will find time to respond to my request.

The University of Alberta, the Department of Education and your school system are concerned with helping beginning teachers and have expressed an interest in the study. Your contributions to the research may be used to assist future industrial arts teachers through the difficult initial teaching experiences.

Since there are so few industrial arts teachers graduating each year, my sample is very small. Without a high percentage of returns, the results will lack some significance.

If you have any questions or have misplaced your questionnaire, please telephone me collect at 1-475-5377.

Sincerely,

David Ible

APPENDIX D

A copy of the research questionnaire and a covering letter used to explain the study and its purpose make-up this appendix.

May 6, 1974

Dear fellow teacher,

When I began teaching industrial arts I was faced with numerous problems--some easy to solve and some that bothered me for several years. I have felt since that very little effort is made by universities and school systems to recognize problems faced by beginning industrial arts teachers and less is done to help them to find solutions. As a result of this interest I have decided to do my Master's of Education thesis in this area.

I have constructed a questionnaire containing approximately 100 potential problems faced by beginning industrial arts teachers. I am soliciting your assistance in my study by asking you to answer the questionnaire. Realizing that you are extremely busy at this time of the year, I have made the questionnaire short and simple. A pilot study revealed that it takes only 15 minutes to answer. All of your responses will be treated with the utmost confidence. No names are required but I have numbered the questionnaires for mailing purposes.

I hope that you can find time to assist me in gathering information that will be of value to all industrial arts teachers, present and future. The success of my study depends upon a high percentage of returns so your cooperation is crucial.

I will be sending you an abstract of the results. Thank you for your anticipated time and effort.

Sincerely,

David Ible

INDUSTRIAL ARTS TEACHER QUESTIONNAIRE

PART I

Please fill out the following required information.

1. Years of industrial arts teaching experience. Include current year. (Circle)

   1 2 3 more

2. Type of teaching experience. (Circle)

   Junior High Senior High Junior and Senior High

3. Population of community where you teach. (Check one)

   Less than 5,000 _____

   More than 5,000 _____

4. Number of full years of teacher education in industrial arts. (Circle)

   1 2 3 4 more

5. Percentage of time teaching industrial arts subjects. (Check one)

   more than 50% _____

   less than 50% _____

6. Degree (Check one)

   B.Ed. (I.A.) _____ Voc.Ed. _____ Other _____

   Graduate Degree _____ Other university degree (specify) _____

   P.D./A.D. _____ No degree _____

7. Industrial arts courses taken. (Check)

   Ed. I.A. 203 _____ Ed. I.A. 260 _____ Ed. I.A. 270 _____

   Ed. I.A. 350 _____ Ed. I.A. 360 _____ Ed. I.A. 370 _____

   Ed. I.A. 460 _____ Ed. I.A. 470 _____

   Other _____

8. Was your student teaching in industrial arts?

   Yes _____ No _____

PART II

Following are 100 statements representing possible problems for beginning industrial arts teachers. For the purpose of this study I have defined a beginning teacher as one in the first three years of teaching. Please read each statement and indicate how you as a beginning industrial arts teacher have perceived the statement as being a difficult problem to solve. If you are a second or third year teacher include your last or two last years in your perception of beginning problems. Your feeling towards the problem statement will be shown by placing an "X" in the appropriate column.

SAMPLE

	Level of Difficulty				
	Extremely difficult	Very difficult	Somewhat difficult	Easy to solve	Very easy to solve
	5	4	3	2	1
Writing instructions that students can readily follow.				X	

An "X" in this column indicates that as a beginning industrial arts teacher, writing instructions that students can readily follow was a problem that was easily solved.

If you feel that the problem statement is not relevant in teaching industrial arts write "N.R." across the scale.

Please respond to all problem statements. Feel free to add to the last page any comments or problem statements that may be useful in this study.

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
1. Developing an effective system for recording attendance					
2. Organization and placement of equipment to facilitate easy and safe operation					
3. Assisting students in recognizing their abilities, aptitudes and interests					
4. Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels					
5. Knowledge of aptitude tests and their application					
6. Finding and reading up-to-date professional literature					
7. Knowing of audio-visual aids and how to use them					
8. Establishing a grading system					
9. Knowledge of provincial industrial arts curriculum					
10. Developing an effective system of checking tools and equipment and clean-up					
11. Finding methods of assisting students in developing good work habits, social attitudes and leadership qualities					
12. Knowledge of correct safety practices					
13. Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)					
14. Integrating instructional material and aids into the lab activities					
15. Sources of instructional aids for teaching industrial arts					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
16. Keeping physically fit for teaching					
17. Getting and using good career information					
18. Adapting teaching methods to consider individual differences of students					
19. Knowledge of the objectives and purposes of industrial arts					
20. Handing out supplies and equipment to students					
21. Handling discipline problems					
22. Finding ways of beginning instruction or lab work promptly					
23. Writing instructions that students can readily follow					
24. Knowing how to select proper lab equipment					
25. Knowing the proper dress and personal appearance for teaching					
26. Understanding just how industrial arts relates to academic subjects					
27. Getting information about technical schools and universities					
28. Awareness of methods of self-evaluation					
29. Establishing a good system for lending equipment or reference material					
30. Establishing an effective system for inventory of equipment or supplies					
31. Knowing what books to get for library and lab					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
32. Sufficient knowledge of the operation and adjustment of equipment					
33. Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems					
34. Awareness of methods of program evaluation					
35. Knowing how to make maximum and effective use of available equipment to meet the objectives of the course					
36. Expressing enthusiasm in teaching					
37. Finding techniques for developing student respect for tools, materials, etc.					
38. Using the conference method of teaching					
39. Constructing your own visual classroom aids					
40. Developing a professional attitude towards teaching					
41. Locating and organizing supplies					
42. Understanding the relationship of industrial arts to vocational and technical education					
43. Knowledge of ordering procedures					
44. Knowledge of procedures for establishing reliability and validity in tests					
45. How to give an effective demonstration					
46. Providing for effective supervisor of the class					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
47. Make minor repairs					
48. Knowledge of proper methods of test construction					
49. Knowing a teacher's responsibility in professional organizations					
50. Making drawings or sketches for clarifying instructions					
51. Knowing where to get good films, slides, etc.					
52. Participating in school staff activities					
53. Understanding the structure or organization of public education					
54. Administrative procedures for dealing with problem students					
55. Knowledge of schools' reporting system					
56. Making effective use of display and bulletin board space					
57. Knowing when and how to provide for small vs. large group instruction					
58. Knowledge of the philosophy underlying industrial arts					
59. Awareness of methods of measuring student progress in the psychomotor domain					
60. Obtaining outside resource people to talk to students					
61. How to use questions effectively					
62. Getting along with other teachers					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
63. Providing for first aid, safety and fire protection in the lab					
64. Understanding the proper channels and lines of communication within the school system					
65. Knowledge of T.V. or radio programs that can assist instruction					
66. Organizing students for duties such as clean-up, tool checks, safety checks, and accident reporting					
67. Measuring student progress in the effective domain					
68. Understanding the overall philosophy, aim and objectives of public education					
69. Understanding supervisory responsibilities of school (e.g. hallway supervision)					
70. Find out other teacher's ideas					
71. Methods of promoting group participation and cooperation					
72. Awareness of the availability of standardized achievement tests					
73. Knowledge of other programs of industrial arts in Alberta and elsewhere					
74. Passing on your ideas to others					
75. Handling daily memos, letters, messages, etc.					
76. How to summarize material presented					
77. Knowing where field trips are accepted by industry					
78. Preventing thefts					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
79. Checking on safety in the lab					
80. Awareness of methods of measuring student progress in the cognitive domain					
81. Knowledge of professional code of ethics					
82. Teaching knowledge of other disciplines that are related to industrial arts					
83. Prevent wasting of materials					
84. Formulating standards of performance to be expected of students					
85. How to introduce a topic so as to establish the interest of students					
86. Knowing your legal responsibility for lab supervision					
87. Knowledge of relationship of the industrial arts program to the rest of the school					
88. Making use of school service personnel such as caretakers, secretaries and maintenance men					
89. Discussing achievement with parents					
90. How to demonstrate relevance of material presented					
91. Preventing damage to equipment					
92. Setting up a system of movement from one activity to another to maximize learning efficiency					
93. Grouping students for content areas					
94. Keeping up with new ideas in industrial arts					

	Extremely difficult 5	Very difficult 4	Somewhat difficult 3	Easy to solve 2	Very easy to solve 1
95. How to interrelate classroom or written work with lab activities					
96. Techniques of oral expression					
97. Organizing class time for marking projects and recording student progress and activity					
98. Establishing a proper relationship between teacher and pupil (e.g. being overly friendly)					
99. Being familiar with the administrators of your school					
100. Understanding how students learn					

APPENDIX E

This appendix is a table which shows the responses, means and standard deviations for 100 problem statements listed on the research instrument.

RESPONSES, MEANS AND STANDARD DEVIATIONS

FOR 100 PROBLEM STATEMENTS

LISTED ON THE RESEARCH INSTRUMENT

No.	Problem statement	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1	(b)	(c)	(d)
1	Developing an effective system for recording attendance	0	0	5	19	25	3	1.50	.56
2	Organization and placement of equipment to facilitate easy and safe operation	0	4	22	24	2	0	2.54	.48
3	Assisting students in recognizing their abilities, aptitudes and interests	0	8	36	5	1	2	2.90	.66
4	Sufficient knowledge of all industrial arts content to meet provincial objectives at all grade levels	7	15	18	8	2	2	3.12	1.44
5	Knowledge of aptitude tests and their application	9	15	11	3	1	13	2.78	3.32
6	Finding and reading up-to-date professional literature	6	9	20	11	4	2	2.92	1.49
7	Knowing of audio-visual aids and how to use them	0	4	13	26	9	0	2.23	.68
8	Establishing a grading system	4	8	23	13	4	0	2.90	1.01
9	Knowledge of provincial industrial arts curriculum	4	8	14	16	9	1	2.59	1.47
10	Developing an effective system of checking tools and equipment and clean-up	1	8	17	16	10	0	2.50	1.06

No.	Problem Statement	Level of difficulty (a) 5	4	3	2	1	NR (b)	$\bar{X}$ (c)	SD (d)
11	Finding methods of assisting students in developing good work habits, social attitudes and leadership qualities	0	11	31	6	3	1	2.92	.72
12	Knowledge of correct safety practices	0	2	16	29	5	0	2.28	.47
13	Having time or interest in becoming involved in such organizations as I.E.C. (formerly I.A.V.E.C.)	8	18	10	10	2	3	3.15	1.98
14	Integrating instructional material and aids into the lab activities	2	11	26	13	0	0	3.09	.61
15	Sources of instructional aids for teaching industrial arts	8	14	20	10	0	0	3.38	.93
16	Keeping physically fit for teaching	1	5	11	21	13	1	2.17	1.07
17	Getting and using good career information	2	13	19	16	0	2	2.90	1.05
18	Adapting teaching methods to consider individual differences of students	0	12	26	11	2	1	2.88	.76
19	Knowledge of the objectives and purposes of industrial arts	2	4	17	23	6	0	2.48	.86
20	Handing out supplies and equipment to students	1	3	24	17	7	0	2.50	.75
21	Handling discipline problems	2	3	24	18	4	1	2.57	.86
22	Finding ways of beginning instruction or lab work promptly	1	4	19	24	3	1	2.48	.75

No.	Problem statement	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1	(b)	(c)	(d)
23	Writing instructions that students can readily follow	1	8	24	16	3	0	2.77	.72
24	Knowing how to select proper lab equipment	0	14	21	12	3	2	2.80	1.04
25	Knowing the proper dress and personal appearance for teaching	0	0	5	21	23	3	2.53	.56
26	Understanding just how industrial arts relates to academic subjects	0	4	12	26	8	2	2.15	.82
27	Getting information about technical schools and universities	1	3	13	26	3	6	2.13	1.15
28	Awareness of methods of self-evaluation	2	15	26	8	1	0	3.17	.64
29	Establishing a good system for lending equipment or reference material	2	8	17	19	5	1	2.61	1.08
30	Establishing an effective system for inventory of equipment or supplies	3	14	22	12	1	0	3.11	.79
31	Knowing what books to get for library and lab	3	12	25	9	3	0	3.05	.86
32	Sufficient knowledge of the operation and adjustment of equipment	3	4	21	19	5	0	2.63	.92
33	Understanding provincial and local relationships in industrial arts, i.e. your operating compared to provincial systems	5	14	22	7	1	3	3.11	1.37

No.	Problem statement	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1			
							(b)	(c)	(d)
34	Awareness of methods of program evaluation	2	12	32	4	0	2	3.11	.79
35	Knowing how to make maximum and effective use of available equipment to meet the objectives of the course	1	7	22	20	1	1	2.69	.75
36	Expressing enthusiasm in teaching	5	3	9	30	5	0	2.48	1.13
37	Finding techniques for developing student respect for tools, materials, etc.	3	18	19	10	2	0	3.19	.89
38	Using the conference method of teaching	7	16	15	5	1	8	2.98	2.40
39	Constructing your own visual classroom aids	4	12	25	9	1	1	3.11	.95
40	Developing a professional attitude towards teaching	4	5	13	27	2	1	2.59	1.09
41	Locating and organizing supplies	2	13	16	17	4	0	2.94	1.01
42	Understanding the relationship of industrial arts to vocational and technical education	2	4	13	27	5	1	2.38	.93
43	Knowledge of ordering procedures	1	4	21	17	8	1	2.42	.94
44	Knowledge of procedures for establishing reliability and validity in tests	8	14	20	9	0	1	3.46	1.11
45	How to give an effective demonstration	2	13	27	10	0	0	2.13	.58

No.	Problem statement	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1	(b)	(c)	(d)
46	Providing for effective supervision of the class	1	4	14	29	4	0	2.40	.66
47	Make minor repairs	1	2	6	24	19	0	1.88	.79
48	Knowledge of proper methods of test construction	2	7	27	15	0	1	2.86	.73
49	Knowing a teacher's responsibility in professional organizations	1	5	22	16	3	3	2.50	1.02
50	Making drawings or sketches for clarifying instructions	0	4	6	34	8	0	2.11	.56
51	Knowing where to get good films, slides, etc.	4	14	22	8	4	0	3.11	1.02
52	Participating in school staff activities	0	1	4	30	16	1	1.76	.48
53	Understanding the structure or organization of public education	2	8	20	18	2	2	2.69	1.06
54	Administrative procedures for dealing with problem students	4	6	20	20	2	0	2.80	.92
55	Knowledge of schools' reporting system	0	1	9	36	6	0	2.09	.36
56	Making effective use of display and bulletin board space	0	6	21	20	3	2	2.50	.83
57	Knowing when and how to provide for small vs. large group instruction	0	3	20	27	1	1	2.44	.52
58	Knowledge of the philosophy underlying industrial arts	1	2	12	29	7	1	2.19	.73

No.	Problem statement	Level of difficulty (a) 5	4	3	2	1	NR (b)	$\bar{X}$ (c)	SD (d)
59	Awareness of methods of measuring student progress in the psychomotor domain	3	12	22	14	0	1	3.01	.90
60	Obtaining outside resource people to talk to students	4	17	21	5	0	5	3.09	1.59
61	How to use questions effectively	0	6	22	24	0	0	2.65	.46
62	Getting along with other teachers	0	0	1	27	24	0	1.55	.28
63	Providing for first aid, safety, and fire protection in the lab	2	3	14	23	9	1	2.28	1.01
64	Understanding the proper channels and lines of communication within the school system	2	3	13	31	3	0	2.42	.71
65	Knowledge of T.V. or radio programs that can assist instruction	4	20	14	10	1	3	3.13	1.46
66	Organizing students for duties such as clean-up, tool checks, safety checks, and accident reporting	2	5	13	27	5	0	2.46	.86
67	Measuring student progress in the effective domain	3	12	26	9	0	2	3.05	.98
68	Understanding the overall philosophy, aim and objectives of public education	3	8	22	17	1	1	2.84	.94
69	Understanding supervisory responsibilities of school (e.g. hallway supervision)	3	2	5	29	13	0	2.10	1.01

No.	Problem statement	Level of difficulty (a) 5	4	3	2	1	NR (b)	$\bar{X}$ (c)	SD (d)
70	Find out other teacher's ideas	2	2	11	32	5	0	2.31	.71
71	Methods of promoting group participation and cooperation	0	4	29	19	0	0	2.71	.36
72	Awareness of the availability of standardized achievement tests	5	15	16	11	1	4	3.00	1.65
73	Knowledge of other programs of industrial arts in Alberta and elsewhere	6	13	17	14	1	1	3.11	1.22
74	Passing on your ideas to others	1	2	18	28	3	0	2.42	.55
75	Handling daily memos, letters, messages, etc.	1	1	11	32	6	1	2.15	.63
76	How to summarize material presented	0	2	18	30	1	1	2.36	.46
77	Knowing where field trips are accepted by industry	3	20	18	9	0	2	3.21	1.09
78	Preventing thefts	8	5	12	20	7	0	2.75	1.57
79	Checking on safety in the lab	0	3	10	30	9	0	2.13	.58
80	Awareness of methods of measuring student progress in the cognitive domain	2	13	28	8	0	1	3.11	.72
81	Knowledge of professional code of ethics	0	3	12	35	2	0	2.31	.40
82	Teaching knowledge of other disciplines that are related to industrial arts	0	3	22	22	3	2	2.40	.70

No.	Problem statment	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1			
							(b)	(c)	(d)
83	Prevent wasting of materials	4	15	15	14	4	0	3.02	1.17
84	Formulating standards of performance to be expected of students	1	11	25	15	0	0	2.96	.58
85	How to introduce a topic so as to establish the interest of students	2	4	23	23	0	0	2.71	.59
86	Knowing your legal responsibility for lab supervision	0	3	5	4	0	0	2.65	.65
87	Knowledge of relationship of the industrial arts program to the rest of the school	0	2	19	29	2	0	2.40	.39
88	Making use of school service personnel such as caretakers, secretaries and maintenance men	2	4	10	31	5	0	2.36	.81
89	Discussing achievement with parents	1	4	23	20	3	1	2.56	.75
90	How to demonstrate relevance of material presented	0	4	20	26	2	0	2.50	.48
91	Preventing damage to equipment	4	5	21	21	1	0	2.81	.85
92	Setting up a system of movement from one activity to another to maximize learning efficiency	2	4	20	22	4	0	2.58	.78
93	Grouping students for content areas	0	6	15	27	3	1	2.42	.71
94	Keeping up with new ideas in industrial arts	2	10	23	12	4	1	2.83	1.03

No.	Problem statement	Level of difficulty (a)					NR	$\bar{X}$	SD
		5	4	3	2	1			
							(b)	(c)	(d)
95	How to interrelate classroom or written work with lab activities	1	7	22	21	1	0	2.73	.62
96	Techniques of oral expression	0	8	15	26	3	0	2.54	.67
97	Organizing class time for marking projects and recording student progress and activity	1	12	22	17	0	0	2.94	.63
98	Establishing a proper relationship between teacher and pupil (e.g. being overly friendly)	0	4	20	26	2	0	2.50	.48
99	Being familiar with the administrators of your school	0	0	11	35	6	0	2.10	.32
100	Understanding how students learn	1	7	27	16	0	1	2.81	.65

(a) Level of difficulty -
5 - Extremely difficult
4 - Very difficult
3 - Somewhat difficult
2 - Easy to solve
1 - Very easy to solve

(b) NR - Not relevant

(c) $\bar{X}$ - Mean

(d) SD - Standard Deviation

APPENDIX F

Data in the table of this appendix show the 20 least difficult problems for beginning industrial arts teachers who participated in the study.

RANK ORDER OF THE

20 LEAST DIFFICULT PROBLEMS

FOR BEGINNING INDUSTRIAL ARTS TEACHERS

No.	Problem statement	Rank
1	Developing an effective system for recording attendance	1
25	Knowing the proper dress and personal appearance for teaching	2
62	Getting along with other teachers	3
52	Participating in school activities	4
47	Make minor repairs	5
99	Being familiar with the administrators of your school	6
55	Knowledge of schools' reporting system	7
69	Understanding supervisory responsibilities of school (e.g. hallway supervision)	8
50	Making drawings or sketches for clarifying instructions	9
45	How to give an effective demonstration	10
79	Checking on safety in the lab	11
27	Getting information about technical schools and universities	12
75	Handling daily memos, letters, messages, etc.	13
26	Understanding just how industrial arts relates to academic subjects	14
16	Keeping physically fit for teaching	15
58	Knowledge of the philosophy underlying industrial arts	16
12	Knowledge of correct safety practices	17
63	Providing for first aid, safety, and fire protection in the lab	18
81	Knowledge of professional code of ethics	19
70	Find out other teacher's ideas	20

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